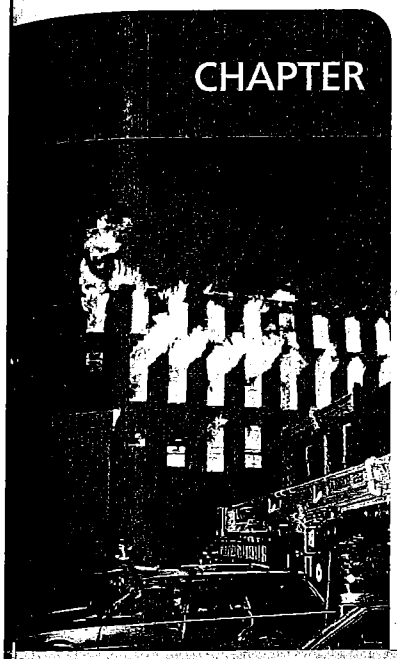
CHAPTER

# 3

# Decision Making



"Plans are nothing; planning is everything."

—Dwight D. Eisenhower

Fast-moving fires in commercial buildings can threaten numerous exposures. *Used with permission of Marty Griffin.*

## KEY TERMS

**crew resource management** *p. 115*
**incident action plan,** *p. 80*
**incident scene decision making,** *p. 88*
**modes of fire attack,** *p. 117*
**planning "p,"** *p. 84*
**size-up,** *p. 91*
**strategy,** *p. 90*
**tactics,** *p. 90*
**tasks,** *p. 108*

## OBJECTIVES

Upon completion of this chapter, the reader should be able to:

- Describe an Incident Action Plan.
- Understand the difference between cue-based and classical decision making.
- Identify and discuss the 13 points of size-up.
- Discuss strategy, tactics, and tasks found in the classical decision making process.
- Discuss the modes of fire attack.

**Resource Central**

For additional review and practice tests, visit **www.bradybooks.com** and click on Resource Central to access book-specific resources for this text! To access Resource Central, follow directions on the Student Access Card provided with this text. If there is no card, go to **www.bradybooks.com** and follow the Resource Central link to Buy Access from there.

Incident scenes are dynamic events. Because there is the ever-present possibility of change, as Incident Commanders we must attempt to predict these changes and be prepared to be one step ahead of these problems.

Overall success involves preparation, as discussed in Chapters 1 and 2. Once we arrive at the emergency scene, our training and experience must take over. Chapter 3 looks at the importance of developing an Incident Action Plan (IAP). Having a practical IAP will ultimately lead to better incident scene decision making. A critical part of the IAP is identifying problems, which we accomplish through our size-up. We can then solve those problems by implementing our strategies, tactics, and tasks. This chapter also reviews the offensive, defensive, and transitional modes of fire attack.

In addition, this chapter reinforces the need to use our training and experience to assist in our constant goal of improving firefighter safety. Having a workable IAP at every incident will enhance safe operations and our decision making process.

## Incident Action Plan and the Planning "P"

incident action plan ■ Contains measurable incident objectives to be achieved in a specific time frame.

The key to successful incident scene operations is proper planning. A major component of the planning process is the use of an **incident action plan** (IAP). The IAP can be just a thought process of the Incident Commander on a minor incident, or it can evolve into a comprehensive written document on larger incidents.

IAPs ensure that everyone is working in concert toward the same goals. They include measurable incident objectives to be achieved in a specific time frame called an Operational Period. IAPs provide a coherent means of communicating the overall incident objectives for both operational and support activities by providing all incident supervisory personnel with direction for actions to be taken as identified in the plan. They may be verbal or written, except for hazardous material incidents, where it must be written, and when written they are prepared by the Planning Section.

For simple incidents of short duration, the IAP will be developed by the Incident Commander and verbally communicated to subordinates. The planning associated with this level of complexity does not demand any formal planning meeting or written instructions.

Under certain conditions, such as additional lead-time, increased staff, and cascading consequences at the scene, Command may need to engage in a more formal process. On larger incidents, the Incident Commander/Unified Commanders can receive assistance in developing the incident objectives and the IAP.

A written IAP should be considered whenever:

- Multiple jurisdictions are involved in the response.
- The incident is of long duration or will involve multiple operational periods.
- A number of ICS organizational elements are activated (typically when all General Staff Sections are staffed).
- It is required by agency policy.
- Hazardous materials are involved in the incident.

An IAP can be prepared for planned events, such as a major training exercise, conventions, parades, or concerts, as well as emergency incidents.

Emergency incidents will demand immediate planning and organizational actions to ensure safe operating activities. The big difference between a planned event and an emergency incident is that the planned event can be accomplished in advance and not have time pressures in which decisions have to be made, while the emergency incident that occurs without the benefit of preplanning can demand that life safety measures be immediately applied.

Incident scene planning involves:

- Evaluating the situation
- Developing incident objectives
- Selecting a strategy(ies)
- Deciding which resources should be used to achieve the objectives in the safest, most efficient, and cost-effective manner

## WHAT A WRITTEN INCIDENT ACTION PLAN DOES

An IAP formally documents incident goals, operational period objectives, and the response strategy as defined by the Incident Commander during the planning process. It contains work assignments (tactics) to achieve goals and objectives within the overall strategy, while providing important situational information on event and response parameters. Equally important, the IAP facilitates dissemination of critical information about the status of response assets (apparatus, personnel, supplies, and equipment). Because incident scenes are constantly evolving, action plans must be revised on a regular basis (at least once per operational period) to maintain consistent, up-to-date guidance across the system.

The following should be considered for inclusion in an IAP:

- Incident objectives (where the response system wants to be at the end of a response)
- Operational period objectives (major areas that must be addressed in the specified operational period to achieve the goals or control objectives)
- Response strategies (priorities and the general approach to accomplish the objectives)
- Response tactics (methods developed by Operations to achieve the objectives)
- Organization list (with an ICS chart showing primary roles and relationships)
- Assignment list (specific duties with work assignments and special instructions)
- Critical assessments (situational updates)
- Composite resource status updates (accountability of all personnel)
- Health and safety plan (to prevent responder injury or illness)
- Communications plan (how functional areas can exchange information)
- Logistics plan (procedures to support Operations with equipment, supplies, etc.)
- Responder's medical plan (providing direction to care for responders)
- Incident map (diagrams/drawings of incident scene)
- Traffic plan (how responders will move around the scene).
- Additional components as indicated by the nature, complexity and scalability of the incident

## OPERATIONAL PERIOD

An IAP is designed for a specific period of time. This time frame is determined by Command along with input from Command and General Staff. The operational period can be for 6, 8, 12, or 24 hours during a response phase, and weeks, or months during a recovery phase, as would occur from a natural disaster. After Hurricane Katrina, weekly IAPs were created to address demolition and debris management issues.

The considerations for an operational period would be:

- Safety of responders and victims
- Work assignments of resources on scene
- Availability of additional personnel
- Future involvement of additional agencies and jurisdictions
- How environmental conditions will impact on the incident scene

Documentation for the planning process is achieved through the use of standard NIMS-approved, incident command system forms. These forms are used to document basic areas of the incident scene. The incident scene documentation starts with Form 201

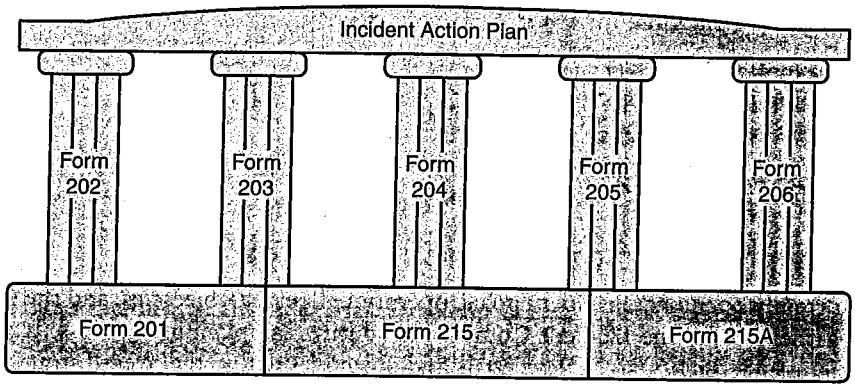



**FIGURE 3-1** Though Forms 201, 215, and 215A are not included in a written Incident Action Plan the information that they contain is the foundation of the Plan.

Incident Briefing (The 201 is a formalized tactical worksheet or command chart). It shows a drawing of the incident scene, a summary of the current actions being performed, an organizational chart that has been created to address the problems found, and a list of all resources dispatched to the scene. This structured form contains the same basic information that an Incident Commander would quickly document, in a less formal manner, on tactical worksheets. Though the Incident Briefing form is not part of the IAP, the information it contains allows for a smooth transfer of command at an incident scene and has the basic information needed to initiate the IAP.

The other forms that make up the foundation of the IAP are:

- ICS Form 215 Operational Planning Worksheet
- ICS Form 215A Safety Officer's Report

ICS Form 215 is the Operational Planning Worksheet and is developed during the Tactics Meeting to provide insight into resource requirements, work boundaries, and tactical assignments.

ICS Form 215A is completed by the Incident Safety Officer (ISO). It addresses each operational aspect of the incident and specifies safety mitigation measures for identified hazards in the Divisions/Groups.

Resource Central
See Sample Incident Command System Forms to access sample forms.

As stated earlier, ICS Forms 201, 215, and 215A are not part of the formal IAP, but are the foundation pieces. As with a building, a strong foundation will support a structure. These forms, when properly utilized, will give the IAP a solid platform. When these preparatory forms address the incident objectives and are used for briefing, resource requirements, and personnel safety, there is a greater chance of a positive outcome.

## COMPONENTS OF AN INCIDENT ACTION PLAN

The main components of any IAP include:

- What do we want to do? (ICS Form 202)
- Who will be responsible for doing it? (ICS Form 203)
- How will it be done? (ICS Form 204)
- How will we talk to each other? (ICS Form 205)
- What happens if someone gets hurt? (ICS Form 206)

ICS Forms 202, 203, 204, 205, and 206 are the basis of the IAP and the preparation of these forms is delegated to the different ICS sections.

### Planning Section

The Planning Section is responsible for preparing ICS Forms 202, 203, and 204:

### *ICS Form 202 Incident Objectives*

- The incident objectives that are received from the Incident Commander/s
- The projected weather forecast for the upcoming operational period
- A safety message from the Incident Safety Officer

***ICS Form 203 Organizational Assignment List*** This is an organizational assignment list that contains the names of everyone in the incident management system who has received an assignment, e.g., Incident Commander, section chiefs, branch directors, supervisors, unit leaders, etc.

***ICS Form 204 Assignment List*** This denotes the divisions, groups, strike teams, task forces and crews, and their individual work assignments or tactics. The work assignment (tactics) is taken from Form 215 Operational Planning Worksheet. For strict accountability a separate Form 204 is created for each division and group. The importance of this form is that it spells out the duties and special instructions required from division and group supervisors that must be performed to achieve the incident objectives for the Operational Period. It includes safety considerations and the radio frequencies to be used by each division or group.

#### Logistics Section

The Logistics Section is responsible for preparing Forms 205 and 206:

***ICS Form 205 Radio Communications Plan*** The use of a common communications plan is essential for ensuring that responders can share information with one another during an incident. Communication equipment, procedures, and systems must operate across jurisdictions and have interoperability between agencies. Developing an integrated voice and data communications system must occur prior to an incident. The ICS Form 205 contains designated radio frequencies for dispatch, tactical, and support functions. A Form 205A may be prepared listing all methods of contact: radio frequency, phone, cell phone, or pager numbers of the essential individuals in the incident management organization.

***ICS Form 206 Medical Plan*** This contains information on medical aid stations, means of transportation, and hospital information for responders that are injured.

#### Other Forms in an IAP

Additional information can be included in the IAP. Common reports that are created by the Logistics Section include a facility map and a traffic plan. The Traffic Plan can be used to designate certain streets or roads for the delivery of supplies, or to establish drop-points for equipment. It can indicate if certain roadways are being utilized as one-way streets to facilitate movement of apparatus/vehicles.

The Planning Section/Situation Unit Leader can create maps that delineate division boundaries and the location of helispots, which are used as landing sites for helicopters to unload supplies or personnel.

The Incident Safety Officer can include a detailed safety plan for clarification of specific hazards and conditions.

Additional information and components of the IAP are at the direction of the IC. The intent of the IAP is to provide flexibility and scalability as a tool for decision making based upon the on-scene conditions.

*Helispot* is a term that originated in wildland firefighting and is a temporary location at the incident where helicopters can safely land and take off to deliver supplies and personnel. Multiple helispots may be used.

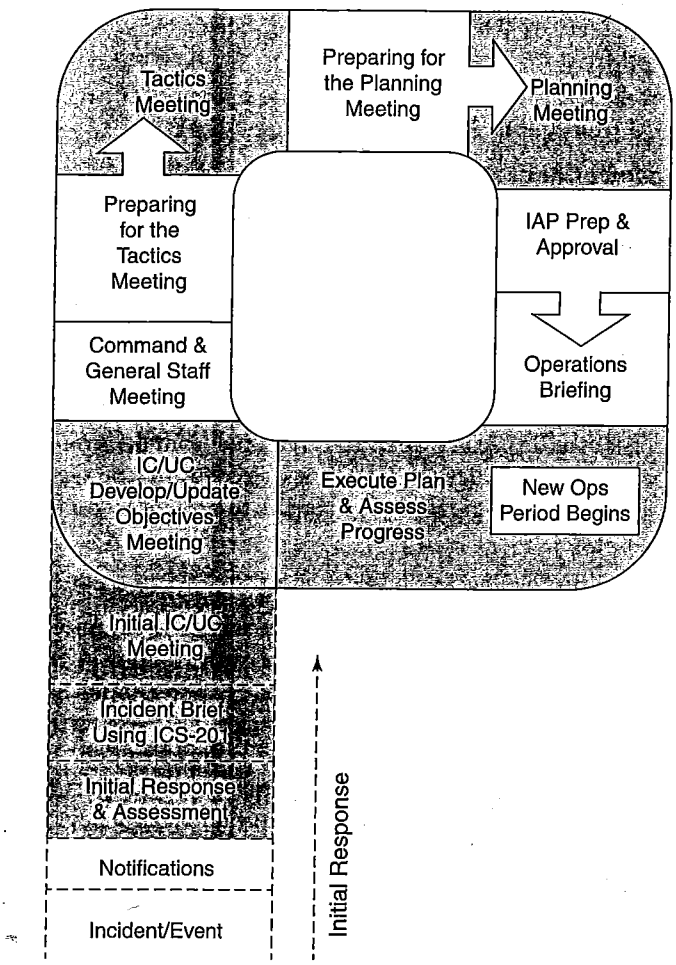



**FIGURE 3-2** The Planning "P" is a guide to the process and steps involved in creating a written incident action plan for an incident.

## PLANNING "P"

planning "p" ■ Is a practical tool that is used in the planning process and for the development of the incident action plan.

The **Planning "P"** is a practical tool that is used in the planning process and for the development of the IAP. (See Figure 3-2) It is a blueprint of actions and meetings that are used to facilitate the handling of an incident scene and the planning process. The leg of the "P" describes the initial response period and the needed actions once the incident/event begins. The specific steps are:

- Notifications
- Initial Response & Assessment
- Incident Briefing (Using ICS form 201 )
- Initial Incident Command (IC)/Unified Command (UC) Meeting (if Unified Command)

At the top of the leg of the "P" is the beginning of the first operational planning period cycle. In this circular sequence there are nine steps:

1. IC/UC Develop/Update Objectives Meeting
2. Command and General Staff Meeting
3. Preparing for the Tactics Meeting
4. Tactics Meeting
5. Preparing for the Planning Meeting
6. Planning Meeting

7. IAP Prep and Approval
8. Operations Period Briefing
9. Execute Plan and Assess Progress

The final step of Execution of the Plan and Assess Progress begins a new operational period and completes the subsequent cycle, and decision makers begin another review of the Planning "P" for the next operational period.

### Reviewing the Planning "P"

***Initial Response and Assessment*** Planning begins with problem identification (on-scene size-up). This is the observation of conditions and circumstances that provide information, cues, prompts, or indicators necessary to make initial management decisions.

***Incident Briefing Using ICS Form 201*** The ICS Form 201 contains critical information about the incident situation and the resources allocated to the scene. This form serves as a permanent record of the initial response to the incident and is used by Command in the Transfer of Command so the incoming Incident Commander can rapidly gain situational awareness.

### Initial Incident Commander/Unified Command Meeting (if Unified Command)

Unified Command is a collaborative team-effort approach. When Unified Command is established, the Unified Incident Commanders meet and decide upon a designated spokesperson, location of a single incident command post (ICP), and timeframes for the creation of a single IAP. This meeting allows the Unified Incident Commanders to discuss and concur on important issues and allows each "agency stakeholder" to present jurisdictional limitations, concerns, and restrictions. During this meeting they need to agree on the following points:

- The organizational structure
- Selection of an Operations Section Chief
- The General Staff positions that will be filled
- A procedure for resource ordering
- A policy for sharing the cost of the incident
- Directions for the release of incident related information
- Other pertinent matters

### The Start of Each Planning Cycle

The Incident Commander/Unified Commanders establish the incident objectives. From the incident objectives the appropriate strategies are developed. The incident objectives are broad statements of guidance and direction that will be used in the development of strategies. The incident objectives state what is to be accomplished in the operational period. It should be noted that not all incidents require detailed written plans. When a detailed written plan is needed, a Planning Meeting is one method that can be used to facilitate the process.

The cyclical planning process is designed to take the overall incident objectives and create tactical assignments to achieve them during the specific operational period. It is important that objectives that address health and safety of personnel are maintained during the course of the event. Other incident objectives can focus on specific steps to reduce operational problems during a single operational period.

### Incident Objectives

An example of incident objectives at a fire in a large two-story motel where many lives are threatened and fire has control of the first floor could be:

- Provide for the safety of all responders and civilians throughout the incident
- Ensure safe removal of all occupants from the fire building within five minutes

- Confine the fire to the first floor within 15 minutes
- Provide feedback to the media within one hour

Incident objectives should be written in a "S.M.A.R.T." format. This implies that they should be:

- Specific—Is the wording precise and unambiguous?
- Measurable—How will achievements be measured?
- Action-oriented—Is an action verb used to describe expected accomplishments?
- Realistic—Is the outcome achievable with given available resources?
- Timely—What is the timeframe? (if applicable)

### Command and General Staff Meeting

The Incident Commander/Unified Commanders may meet with the Command and General Staff to gather input and ideas or to provide immediate direction that cannot wait until the planning process is completed. This meeting occurs as needed and should be short and concise.

### Preparing for and Conducting the Tactics Meeting

The Operations Section Chief, Safety Officer, Logistics Section Chief, and Resources Unit Leader attend the Tactics Meeting. The Operations Section Chief and the Safety Officer have major roles. Documentation is on the ICS Form 215 Operational Planning Worksheet, and ICS Form 215A Incident Safety Analysis.

The creation of ICS Form 215 can build upon the current organizational structure that is already in place on the incident scene, or create branches, divisions, and groups to achieve the incident objectives for the next operational period. The basis for a written IAP is to list the objectives, determine the strategies that are needed to achieve the objectives, and develop the necessary tactics to achieve life safety, incident stabilization, environmental protection, and property conservation endeavors. (Tactics can be referred to as "work assignments" or "control operations" in some NIMS documents/forms.)

The purpose of the Tactics Meeting is to review the work assignments, resource requirements, and reporting locations for the next operational period's resources. This information is then placed onto Form 215. The Operations Section Chief develops the tactical measures that will support the proposed strategies and objectives provided by the IC/UC.

The Tactics Meeting will provide the following information:

- Assignments of resources to implement the tactics
- Methods for monitoring tactics and resources to determine if adjustments are required (e.g., different tactics, different resources, or a new strategy)
- Reporting location and time for oncoming resources

The Tactics Meeting will ensure adherence to the unity of command principle, span of control guidelines, and accountability. Another factor is to ensure that the resource assignments consist of the needed resources by kind, type, and numbers to achieve the objectives mandated for the next operational period. If the required tactical resources are not available, then an adjustment must be made to the work assignments being considered. It is very important that the availability of tactical resources be determined prior to spending a great deal of time working on the selection of strategies and developing tactical activities that realistically cannot be achieved.

### Preparing for the Planning Meeting

Following the Tactics Meeting, preparations are made for the Planning Meeting to include the following actions coordinated by the Planning Section:

- Review the ICS Form 215 developed in the Tactics Meeting
- Review the ICS Form 215A Incident Safety Analysis (prepared by the Safety Officer), based on the information contained on ICS Form 215.

- Assess the current operational and logistical effectiveness
- Gather information to assist in Command decision making; the plan will already have been agreed upon

### Planning Meeting

The Planning Meeting provides the opportunity for the Command and General Staff to review and validate the operational decisions as proposed by the Operations Section Chief. Attendance is required for all Command and General Staff. Additional incident personnel, public officials, and private sector representatives may attend at the request of the Planning Section Chief or the Incident Commander. The Planning Section Chief conducts the Planning Meeting following a fixed agenda and it should be completed in 30 minutes or less.

The Operations Section Chief delineates the amount and type of resources needed to accomplish the objectives of the operational period. The Planning Section's "Resources Unit" works with the Logistics Section to accommodate the request for resources.

At the conclusion of this meeting, the Planning Section Staff will indicate when all elements of the plan and supporting documents are to be submitted for duplication, collation, and distribution for the Operational Period Briefing.

### IAP Preparation and Approval

The next step in the Incident Action Planning Process is plan preparation and approval of the plan. The written plan is comprised of a series of standard forms (202, 203, 204, 205, and 206) and supporting documents that convey the Incident Commander's intent and the Operations Section's direction for the accomplishment of incident objectives during the next operational period.

Once the IAP is completed it must be approved and signed by Command.

### Operations Period Briefing

The Operations Period Briefing may also be referred to as the Operational Briefing or the Shift Briefing. This briefing is conducted at the beginning of each Operational Period and presents the Incident Action Plan to branch directors, division and group supervisors, strike team, task force, and crew leaders. The Operations Section Chief will discuss the strategies and tactics needed to accomplish the incident objectives, and each division and group supervisor will review their individual ICS Form 204. This form, which is contained in the IAP, addresses their work assignments, accountability, communications, and safety information.

Following the Operations Period Briefing, supervisors will meet with their assigned resources for a detailed briefing on their respective assignments. This will include any information that has been received from off-going supervisory personnel from the previous operational period or any new developments that have occurred since the IAP was finalized.

### Execute Plan and Assess Progress

The Operations Section directs the implementation of the plan. Supervisory personnel in all Sections are responsible for accomplishing various duties during the Operational Period.

The plan is evaluated at various stages in its development and implementation. The Operations Section Chief may make adjustments during the Operational Period to ensure that the objectives are being met and effectiveness is assured.

The cyclical process of the Planning "P" enables it to be used to continually evaluate the situation and adjust for changes that may occur at the incident scene.

A planning cycle should be initiated for each operational period. An assessment must be made of the current situation and whether it is stable or dynamic. If changing:

- Is it increasing in size or complexity?
- Are the objectives effective or is a change needed?
- How long until the objectives are completed?
- What is the current status of resources?

Resource Central
Sample incident action plans and directions for completion are also available under Sample Incident Command System Forms and Sample Incident Action Plans and a Sample Form for a Prescribed Live Burn.

The Incident Action Plan (IAP) and the Planning "P" facilitate effective management at both planned events and unplanned emergencies. Proficiency in the planning process requires training and exercises. Regular practice will ensure that the initial responders are properly prepared to handle any size or type of incident in their community.

## ON SCENE

The story of a deadly refinery fire that took the lives of eight Philadelphia firefighters and critically injured two others carries an example of how one comment can save a life. Crews were operating in an area of poor drainage, and water had built up to a height of over two feet. Unbeknownst to the firefighters, leaking crude oil was floating on the surface of the water beneath a layer of foam. As firefighters were refilling a foam unit, they broke the foam layer, and a foam unit's muffler ignited the crude oil.

At the time of the fire, I was the captain of Engine 49 on another platoon. One of the injured firefighters was assigned to my company, and on visiting him later at the burn center, our discussions led to how he was able to survive this disaster. He stated that at the time he was engulfed in flames two thoughts entered his mind: "Get the hell out of there" and "Don't breathe." The thought about not breathing was something that had been told to him 15 years earlier as a new recruit at the fire academy by a lieutenant during an informal discussion. The lieutenant had said that if caught in flames without a mask, breathing in the superheated vapors would cause internal damage, probably resulting in death. The injured firefighter could not recall ever thinking of this discussion in the previous 15 years until the moment that he needed it most. This "cue" saved his life.

Resource Central
See Case Studies for full incident description of the Gulf Oil Refinery Fire.

Resource Central
See Command System Organization Chart for additional information.

## Incident Scene Decision Making

incident scene decision making ■ The two basic methods are the classical method and the *naturalistic,* or *recognition prime,* or *cue-based* method.

There are two basic methods of **incident scene decision making.** The system most often discussed is the *classical method.* In this system, an individual proceeds step-by-step in a long and precise process that in and of itself is time-consuming. This method has some application at an incident, but usually in a minor role.

The system used by most fire officers is referred to by a variety of names: *naturalistic, recognition prime,* or *cue-based* decision making. This is a process in which extremely fast decisions are made. The process is dependent on the experience and training level of the decision-maker.

### CUE-BASED DECISION MAKING

The fire officer, through personal experience of training exercises, incident scene responses, and studying, has built a base of knowledge. This knowledge is embedded in the brain and is readily recallable. At an incident, the brain automatically associates past experiences with current developments. This tying together of past and present events lets the Incident Commander recognize signs or cues that are present and determine strategies, tactics, and tasks to mitigate the emergency. A recognition factor can occur through sight, hearing, or smell. The brain automatically reacts to remember or visualize past associations. It can be thought of as reliving a dream or happening. (It is similar to looking at a photo album of snapshots of a long-past family outing and recalling the events that took place the day the photos were taken.) These snapshots of past events may or may not have been occurrences that fully impressed the fire officer at the time they originally occurred. In many post-incident debriefings and critiques that I have participated in, many firefighters do not seem to remember these happenings as having been significant occurrences at the time.

### Critical Cues

The decision-maker relies on reading critical cues from the incident, analyzing them, and reacting to those critical cues in a manner previously witnessed or learned. For the highest efficiency, the decision-maker must know which critical cues are important for the specific situation and the most effective responses to each critical cue. (For example, if we learn the correct critical cues, but learn the incorrect response to those critical cues, the decisions made will be flawed and the correct and most efficient solutions will not be applied.)

Even if the firefighter has not been exposed to a particular type of fire situation, he or she can often see occurrences that will automatically be associated to similar events. Though there may not be enough information to fully solve the problem, it usually allows a starting point. The fire officer can then monitor the situation and look for additional signs to continue to address the problems as they develop.

Cue-based decision making is extremely rapid and is the desired method for emergency operations when the experience level allows the Incident Commander to implement it. Without a sufficient knowledge base, decisions will need to be analyzed through the classical method.

## CLASSICAL METHOD OF DECISION MAKING

The classical method of decision making is used for training exercises, developing of preplans, or when the type of incident presents cues that require a set of reactions that the decision-maker has not experienced or learned before the incident occurs. In this instance, the decision-maker must process information through the following steps:

- Read the cues.
- Compare those cues to what has been learned from similar situations.
- Review the command sequence.
- Determine the actual problems and the strategies to solve those problems.
- Evaluate and select the most effective tactics.
- Implement the tasks.
- Arrive at a conclusion or result by hypothesizing.

**FIGURE 3-3** Fires in "three-deckers" are routine operations in some areas. Previous experience of the Incident Commander can make cue-based decision making extremely rapid and can be easily applied to this type of fire situation. *Used with permission of Joseph Hoffman.*

Having completed this process, and if the resulting actions are successful, the decision maker in future similar situations will simply use the cue-based knowledge gained from this experience to reach the desired conclusions and results.

## THE COMMAND SEQUENCE

Fireground operations must be handled with a systematic approach. To respond to a scene with no prior thought and expect the overall operation to run smoothly is being overly optimistic. The implementation of an Incident Action Plan by the first-arriving fire officer is critical. The officer assuming Command must use a system to perform a proper size-up of the situation. The command sequence can be utilized to assist the Incident Commander in decision-making. It gives the IC a standardized and sequential thought process to ensure that nothing has been overlooked. The command sequence consists of five levels:

- Level 1: Incident Priorities
- Level 2: Size-Up
- Level 3: Strategy
- Level 4: Tactics
- Level 5: Tasks

Let's look at each level of the command sequence:

### Level 1: Incident Priorities

strategy ■ The overall goals that will solve the problems found.

tactics ■ The way strategies or goals will be achieved.

The best method of remaining proactive is through the use of a logical thought process. The determination of incident priorities, in conjunction with size-up, assists in the development of **strategy** and **tactics**. Incident priorities are the foundation of the command sequence. All of our actions are based upon these priorities. The priorities are life safety, incident stabilization, and property conservation. This list is in the order of importance placed on these functions.

***Priority 1—Life Safety*** Life safety is always our number one consideration. It includes endangered civilians, responding firefighters, and other public safety personnel operating at the incident scene.

***Priority 2—Incident Stabilization*** We hope to mitigate the problems encountered. The actions taken will differ depending on the type of incident.

- At a structure fire, our aim is to confine the fire to as small an area as possible. Realistically, this could be one room, one floor, an entire building, or several buildings. The factors that must be considered are numerous: construction, resources at the scene, resources responding, and the many other points of size-up performed at every incident.
- On a medical response it is important to stabilize the patient.
- A hazardous materials incident could include stopping a leak and containing the spilled material.

The accomplishment of priority 2 cannot expose firefighters to undue risk, thereby violating our first priority of life safety of the firefighters.

***Priority 3—Property Conservation*** A fire department's efforts should be directed toward minimizing property damage. (See Figure 3-4) This can be achieved through quick extinguishment of fire and employing good salvage methods. Property loss reduction benefits the building owner, occupants, the community, and the fire department, through good public relations. Property conservation includes fire damage and any resultant damage associated with the firefighting effort. Proper ventilation and minimizing water damage can reduce the total loss.

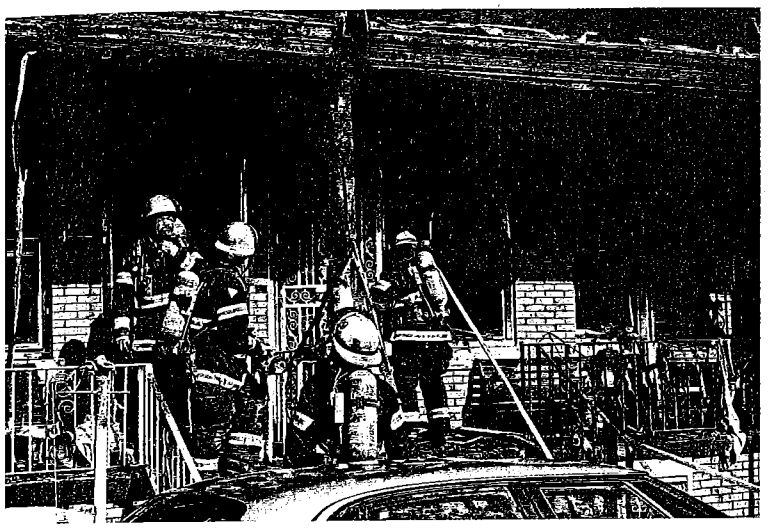


**FIGURE 3-4** Property conservation includes fire damage and any resultant damage associated with the firefighting efforts. Good overhauling procedures can minimize damage. *Used with permission of Greg Masi.*

Priorities never change, though implementation may. Quick extinguishment of a fire on a lower floor of a multistoried building will protect the lives of occupants above. By implementing priority 2 (incident stabilization) we accomplish priority 1 (life safety).

## Size-Up

### Level 2: Size-Up

**Size-up** lets the Incident Commander gather information for the development of strategic goals. It is a mental process weighing all factors of the incident against the available resources. Size-up can be looked at as solving a problem or as a puzzle that requires putting the pieces in their correct place by gathering and interpreting the available information. It is an evaluation process that reviews all critical factors that could have a positive or negative impact on an incident.

size-up ■ Identifies problems at an incident scene.

Size-up starts in the preplanning stages. Preparation allows for a better overall operation and makes information readily available to the Incident Commander. At the time of the alarm, the previously gathered information will be invaluable as our size-up is

### NIOSH FIREFIGHTER FATALITY REPORT F2009-11

On April 12, 2009, a 30-year-old male career probationary firefighter and a 50-year-old male career captain were killed when they were trapped by rapid fire progression in a wind-driven residential structure fire. The victims were members of the first arriving company and initiated interior operations with an offensive attack through the front entrance. Less than six minutes after arriving on scene, the victims became disoriented as high winds pushed the rapidly growing fire through the den and living room areas where interior crews were operating. Seven other firefighters were driven from the structure, but the two victims were unable to escape. Rescue operations were immediately initiated but had to be suspended as conditions deteriorated. The victims were located and removed from the structure approximately 40 minutes after they arrived on location.

Key contributing factors identified in this investigation included: an inadequate size-up prior to committing to tactical operations; lack of understanding of fire behavior and fire dynamics; fire in a void space burning in a ventilation controlled regime; high winds; uncoordinated tactical operations, in particular fire control and tactical ventilation; failure to protect the means of egress with a backup hose line; inadequate fireground communications; and failure to react appropriately to deteriorating conditions.

initiated. It has been said that size-up is anticipation en route and habitation on arrival. While responding, we are wondering what we will find. What type of building? What is the fire load? What is the fire location and are there any exposed buildings? On arrival, we shift into a higher gear and must immediately address the life safety of civilians. The en route size-up will be based on information given to dispatch and relayed to the IC as he or she responds. It should include personal knowledge of the structure, information the driver or engineer may possess, and any preplans that may be in place. Size-up information can come from occupants, bystanders, or placards on buildings, tanks, or vehicles containing hazardous materials.

On arrival at the fire scene, it is best to do a 360-degree walk-around of the fire building or incident. (Some large-area fires or hazardous-materials incidents make this impractical, in which case reports from individual divisions and groups will have to suffice.) (See Figure 3-5) In some cases, the rear or sides of a building can be viewed from the apparatus or chief's vehicle as it arrives on scene. This 360-degree walk-around permits a view of the entire structure. This allows us to develop a personal size-up assessment and, when receiving status reports from Division and Group Supervisors, to establish whether the situation has improved or deteriorated by comparing it to the conditions observed on arrival. (See Figure 3-6)

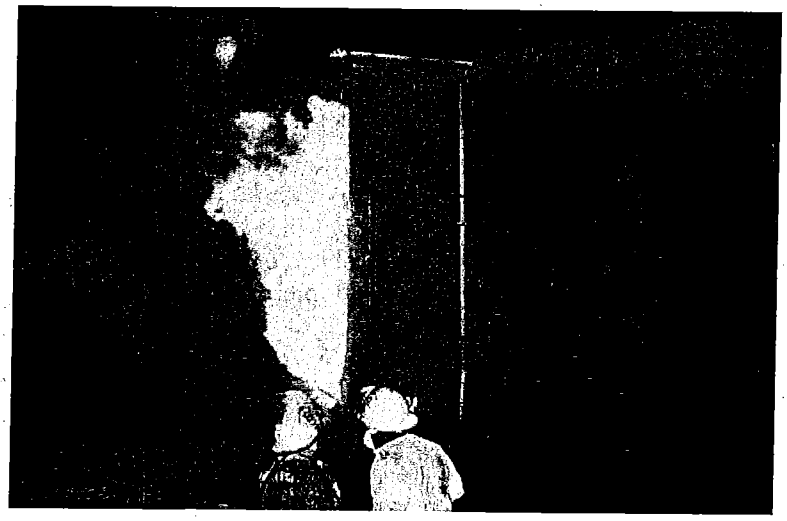


**FIGURE 3-5** A chief doing an initial size-up must do a 360-degree walk-around to ensure a full survey of the fire area. The chief's view as shown in the photo limits his knowledge as to the size of the structure and the amount of fire involvement. *Used with permission of Joseph Hoffman.*

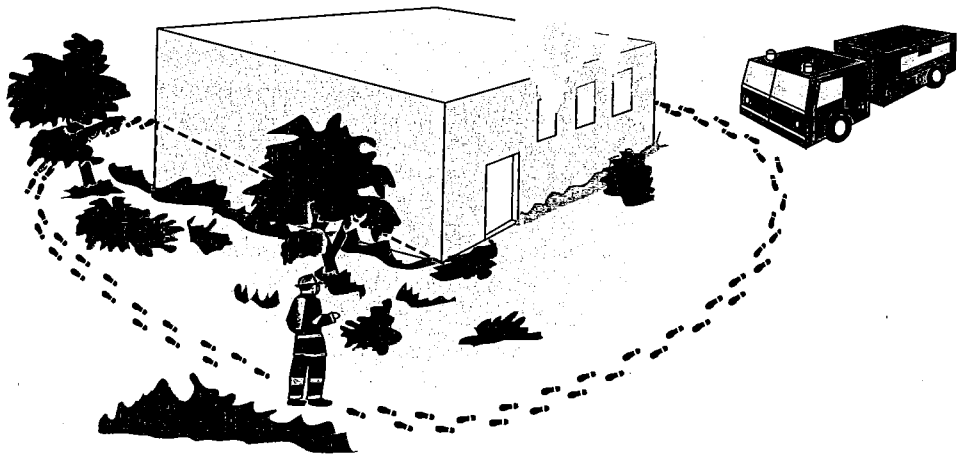


**FIGURE 3-6** The 360-degree walk-around enables the officer doing the size-up to see what the initial conditions are. As the incident progresses and Division and Group Supervisors are assigned, their progress reports will enable the Incident Commander to know if conditions are improving or worsening. *Used with permission of Michael DeLuca.*

***Company Officer versus Chief Officer Size-Up*** Size-up in preparation for assuming of Command falls into two categories: the company officer's and the chief officer's. There is a distinct difference between these two size-ups (assuming that the company officer is first to arrive). The company officer has a need for action. He or she has to make an immediate decision about the volume and intensity of the fire and determine the initial strategies and tactics to be deployed. In this growing emergency, when the life hazard will be most severe, he or she will have no prior assessment of interior conditions to assist them.

The chief officer has certain advantages while performing size-up. There is slightly more time to make decisions. The life hazard will, most likely, already have been assessed. The chief will have the benefit of an interior assessment on which to base decisions.

## OBSERVATION THROUGH THE USE OF OUR SENSES

Those operating on the incident scene need to know many size-up factors. Though size-up is a primary responsibility of the Incident Commander, it must be performed by all firefighters at an incident. A supervisor who has received a report or performed a 360-degree walk-around should share any necessary facts with the company members. A wall crack or an unsafe floor is a safety factor that everyone operating in those areas needs to know about. Size-up allows us to handle an emergency incident in a professional manner. It is facilitated through our observations. Size-up requires the use of the senses of touch, smell, hearing, and sight. What do you feel? What do you smell? What do you hear? What do you see?

### Sense of Touch

The sense of touch enables us to determine the weather conditions or temperature differences when confronted with the heat of a fire:

- Icy conditions underfoot
- The temperature of runoff water
- The condition of a roof or a floor—is it spongy or firm?
- The wind blowing in our face allows us to determine how a fire might be affected by the weather conditions.

### Sense of Smell

Certain odors are quite common and identifiable. These include:

- The smell of natural or liquefied petroleum gas
- The obvious odor of a misfiring oil burner
- The strong odor of gasoline fumes or paint thinners indicating the possibility of explosive mixtures
- The distinctive burnt smell of unattended food left on a stove

Yet some serious problems are odorless, as in the case of carbon monoxide. A detector or monitor is needed to warn us of the presence of high concentrations of this deadly gas.

### Sense of Hearing

Communication is one of the most critical parts of any successful operation. Our sense of hearing and understanding of the spoken word is indispensable. Yet the noise associated with an emergency scene can create a problem for firefighters. The blare of radio messages, fire officers giving orders, apparatus diesel engines being accelerated to increase pump pressures or to supply power to an aerial equipped apparatus, are all part of the sounds found at an incident scene. Added to that noise might be the excited occupant or neighbor who attempts to give information on the location of those trapped within a fire building.

Firefighters can be the recipients of misguided information. Being told that everyone is out of the fire building may only refer to that individual's family or specific business occupancy and not other occupants within a building containing multiple apartments or businesses. Even at a private residence the report that everyone is out of the building can be faulty. A visiting relative or friend of a child who is at the house may be forgotten.

There are those who will meet firefighters at an incident scene and feel compelled to say something. An example is the person begging you to rescue the children. This beseeching of our help would lead one to believe that children must be trapped and in need of immediate rescue. In many cases what the person is actually saying is that the family that lives in the fire building includes children. They may have no idea if anyone is home, but they tell you of the need for rescue just in case they might be.

Verbal reports from civilians at the scene will often dictate firefighting tactics. The fact that someone is reported trapped within a burning building will lead firefighters to concentrate on protecting the area where they are reported to be for their safety and that of the firefighters attempting to rescue them.

Firefighters need to question anyone giving them information about occupants to clarify with certainty that someone is within the fire building. The importance of receiving good information will assist in determining the risk/benefit factor. This is the amount of risk that firefighters take in attempting to save a life, or in fighting a fire. Reports of people trapped within a fire building can lead to fighting a fire differently than if everyone was safely out of a building. Misinformation can endanger firefighters and delay searching other areas where occupants can be trapped. It can place firefighters in dangerous areas where they may not have otherwise been.

### Language Barriers

Another problem arises when language barriers interfere with our communications. Questions asked of occupants who have escaped on whether anyone is still within the fire building might be answered with an affirmative nod of the head. This seemingly "yes" answer may be to a question that was not understood by the occupant due to a lack of understanding if English is not his or her first language. It can lead to the firefighter receiving inaccurate data. This is especially true when rapid-fire questions are being asked by firefighters who realize that seconds count and want an immediate response. Language barriers may be overcome by consulting with bilingual firefighters, police officers, or neighbors who can assist in interpreting for the fire officer.

### Other Sources of Information

Listening starts at the time the alarm is received and continues throughout an alarm. It includes:

- The initial dispatch data and the reports received en route
- The messages received in face-to-face communications
- Reports that are given either directly or indirectly during radio transmissions
- The progress reports of the headway being made, or of problems encountered that are hindering progress
- The striking of additional alarms by the Incident Commander, or the request for more units to respond to the scene indicating a growing emergency is another indicator or cue
- Calls of warnings in the form of Maydays or urgent messages
- Progress reports given by the Incident Commander
- The cries for help of a trapped person, or the pleas for the rescue of a family member who is still in a burning building
- The sound of power saws operating on a roof, signaling vertical ventilation operations being performed
- The noise created by generators being used to operate extrication or forcible entry tools

These are all cues that firefighters can hear at an incident to assist them in their individual size-up process.

### Sense of Sight

Sight permits us to gather many of the size-up factors needed to permit an effective analysis of the incident scene. What is seen on arrival? Can we be easily distracted? Is one fixated on fire pushing or blowing from a window? Has a person calling for help from a rooftop gained all of our attention? Can a complete visual observation of the structure and the surrounding buildings be performed?

Sight allows us to identify factors such as the location of smoke and fire, its volume, and energy. The flame color could indicate a higher temperature. The color and the action of smoke can indicate a growing fire situation or a fire being brought under control through the fire department's efforts.

The initial view from the exterior rarely gives a complete picture of what must be accomplished. The exception is when the building is fully involved and leaves little doubt that the life safety of the occupants has already been compromised and that a defensive attack and protection of exposures is the only strategy that can be employed.

## FIREFIGHTER SIZE-UP

In addition to the size-up data required by the fire officer who will assume Command, size-up information should be gathered by each firefighter. Size-up contains general areas for everyone at an incident scene as well as specific areas that are dependent on their individual assignments.

The size-up information needed by a firefighter assigned as a driver/engineer on an engine or pumper will differ from that of a driver/engineer of a truck company. Likewise, a firefighter assigned to an engine and responsible for control and extinguishment will have a different size-up than a firefighter assigned to a truck company and concerned with rescue, ventilation, and forcible entry.

As various structures are sized up specific concerns of those occupancies will need to be considered. The size-up factors could continue to grow depending upon the slightest variations of circumstances, such as life safety, occupancy, contents, time, area, and height.

An excellent preplanning exercise is to select a building and list the size-up considerations for the Incident Commander and the factors that should be identified for each firefighting assignment.

There are general and specific size-up factors for various assignments. Let us look at some size-up areas for consideration at a structure fire.

### General Size-up Considerations for All Firefighters

There are some general size-up factors that are important for everyone to know:

- Information given by dispatch on the alarm (type of structure, report of people trapped, hazardous materials incident, etc.)
- Supplemental information given by dispatch
- The size of the building. How many stories? Type of structure: private dwelling, apartment building, commercial structure?
- If an apartment building, how many units? Count the mailboxes, doorbells, electric or gas meters.
- The type of building construction and how fire can impact on the specific type of construction
- The number of stories of the fire building and the exposed buildings
- The location of the fire within the building. The location of the fire will impact on life safety and fire attack, such as a top floor fire versus a fire on a lower floor. The top floor fire can take longer to reach and will have longer hose-line stretches whereas the fire on the lower floor will threaten the occupants on the floors above the fire floor.

- Accessibility: into the fire building, to the upper floors (fire stairs, elevators), to the rear of the structure, to the roof, etc.
- The smoke conditions
- Offensive or defensive attack? Hand lines or master streams?
- Time factors: what is the lag time or reflex time? (the time it takes from receiving an order to accomplishing it)
- What life safety cues are present? For example, a car parked in the driveway of a dwelling, or curtains on the windows on the upper floors above a store.
- All firefighters must be aware of changing conditions that could affect both themselves and the other firefighters operating at an incident scene. This could include collapse indicators, rapid fire spread, or dangerous conditions (i.e., holes in floors or the presence of hazardous materials). Should any of these conditions be found, the Division/Group Supervisor and/or the Incident Commander should be immediately notified.

### *General Size-Up Considerations for Drivers of Fire Department Apparatus Responding to a Fire Assignment*

These could include:

- The exact address of the incident
- The route to take to the incident scene. Are there any street detours that could affect the response?
- What other fire department units on the dispatch may use the same intersections while responding? Who has the right-of-way?
- Are there any parked vehicles or other obstructions (such as trash dumpsters) that will affect apparatus placement?
- Placing the apparatus in such a way as to allow the ease of stretching of hose-lines, while keeping streets open for other apparatus
- Safe placement of the apparatus considering immediate and anticipated collapse or safety zones. In placing the apparatus the operator must consider the potential for an expanding fire that could increase the size of the collapse zones.

### *Specific Size-Up Considerations by the Firefighter or Engineer Driving an Engine or Pumper*

These could include:

- Is the address located in a hydrant area, and if so, where would the closest hydrant be located?
- Are the water mains of sufficient size to supply an adequate water supply?
- At a major fire is there a point where the water mains would be overtaxed?
- Is the closest hydrant accessible or obstructed by illegally parked vehicles?
- In non-hydrant areas will a tender be assigned? Are there other sources of water available to use as a water supply, i.e., a lake, stream, swimming pools?
- If using an alternate water source, is there suitable apparatus access to set up a drafting operation?
- Where is a good location for dump tanks?
- What is the type of structure? Will it necessitate the use of 2½" or larger hose-lines? Can a large diameter hose-line (LDH) be utilized for either supply lines or firefighting?
- If not the first-due engine, what assignment has your company been given? Will this impact your apparatus placement?
- If a truck company is responding is it coming from the same direction as the engine company or a different direction? This is needed so the engineer can reserve the front of the fire building for the placement of the truck company.
- Will ground ladders be needed from the first-due engine company? If yes, will they be needed to perform rescue operations before hose-lines are stretched?

- Will the engineer initially need to supply hose-lines or assist in raising ladders for the rescue of occupants?
- If the second-due engine company's responsibility is to provide a continuous water supply for the first-due engine, what is the best way to accomplish it?
- Predict the needs of the company and be prepared to meet those needs. Should a fire not be darkened down, will another attack hose-line be required?
- Are there standpipes or sprinklers that should be pressurized to ensure an adequate flow of water?

### *Specific Size-Up Considerations Performed by Firefighters Responsible for Handling Hose-Lines*

These could include:

- The location of anyone at a window in need of rescue
- Are the occupants physically able to self-evacuate? Are they mentally or physically challenged? Can they understand instructions? Will they require fire department assistance?
- Are there smoke detectors or carbon monoxide (CO) detectors sounding?
- Are coded alarms sounding indicating a specific fire location in a large building?
- Are there indicator panels giving the location of the alarms received?
- Has someone from the building met the fire department and informed them of the reported location of the fire or other pertinent data?
- What is the best way to attack the fire while protecting the civilians and firefighters and minimizing the spread of the fire?
- What size hose-lines will be needed? How many hose-lines? Placement of hose-lines?
- The location of portable ladders that are already placed and can be used as a secondary means of egress from the fire building
- The location of other units and hose-lines operating in a fire building to ensure safety and teamwork in attacking a fire
- The location of fire escapes. Are occupants using them to escape the building? Can they be used to advance hose-lines to the upper floors?
- Buildings set back a distance from the street, or buildings that are deeper than normal. This could be an indication that pre-connected hose-lines may not be of sufficient length to reach the fire.
- What is the best method of getting a hose-line to an upper floor in a building that has no standpipe?
- Are there standpipes in a building that can be utilized? Is the system looped? Are there individual risers that need to be specifically pressurized? How are the individual risers marked or identified?
- The job of hose-line crews is to protect search and rescue crews operating around and above the fire area.
- When required, back up a hose-line with a hose-line of the same size or larger.
- Ensure that before proceeding to an upper floor to fight a fire a hose-line(s) is in place on the floors below attacking fire at those locations.
- Are there any impediments that would prevent egress, i.e., window air conditioners, steel bars on windows?

### *Specific Size-Up Considerations by the Driver/Engineer of the Truck or Platform*

These could include:

- Size-up of all sides of the fire building to help identify locations for the placement of apparatus, aerial devices and portable ladders
- What assignment has your company been given? Will this impact on your apparatus placement? Apparatus placement must consider the use of the main

ladder or platform. Spotting the turntable for rescue at an offensive attack or placing the apparatus at the corner of the building for a defensive attack.
- What is the best way to rescue those in need? Main ladder, platform, portable ladders, interior rescue?
- Are there any obstructions (trees, electric wires, etc.) that will impact on raising portable ladders, main ladders, or platforms?

***Specific Size-Up Considerations by the Firefighters on the Truck Who will Perform the Rescue, Laddering, Forcible Entry, and Ventilation***

These could include:

- The location of the fire. Is it safe to operate on the roof or the floors above the fire?
- Has the fire extended to any exposed buildings that may need to be evacuated?
- The location of smoke and visible fire within the fire building. What information can be gleaned from the radio reports? Where are the hose-lines being stretched? What reports are being given to the other units that are on the scene?
- Is there any information on people in need of rescue? From where? Is anyone visible at windows or on rooftops? If people are at windows, who is in the greatest danger?
- Can a search be performed under the protection of a hose-line?
- What is the location of the fire within the building and the best way to achieve ventilation: horizontal, vertical, positive pressure, hydraulic, or utilization of the building's heating, ventilation, and air-conditioning system?
- Will the wind affect the spread of the fire? In which direction should the ventilation be performed?
- Are there impediments to ventilation? Bars on windows, window air-conditioners, glass block windows, stationary awnings over windows, etc?
- Is forcible entry needed? If so where and how? What tools are needed in addition to the normally assigned tools? Are there any special concerns, such as special occupancies with highly advanced security systems, guard dogs, etc.?
- Have ladders already been placed by engine companies or other truck companies?
- Where should portable ladders be placed? For what use: rescue, ventilation, access, or as a secondary means of egress?
- Are there fire escapes that can be used for access, egress, ventilation, rescue, etc.?
- How should the primary search be conducted? What is the most critical area? Second most critical area?
- What exposures are there and what duties must the truck perform either in or on them?
- Is there a possibility of fire spread? Can the truck members perform duties to minimize fire spread? Can the truck members discover hidden fire?
- In buildings that have been converted from large single-family dwellings to apartments expect numerous interconnecting void spaces where a fire can burn undetected, making it difficult to locate.
- Are there interconnected attics or cocklofts?
- Can thermal imaging devices be used to determine the location of people trapped and the possible spread of fire?
- What cues are there on the roof that the Incident Commander needs to know about? Dead loads in the form of air conditioner units? Heavy smoke or fire conditions?
- What overhauling will be needed after the fire has been knocked down?
- Will salvage be needed?
- What are the contents of the building? How can they impact on the overall operation, i.e., flammable contents, life safety at a school, an orphanage, nursing home, hospital?

- What is the status of the building's heating, ventilation, and air-conditioning (HVAC) system?
- What is the status of the elevators?

The following is an overview of the basic areas every good size-up should consider.

***Wallace Was Hot*** There are an endless number of mnemonic devices that are used for remembering the different size-up factors. One that covers the 13 points of size-up is Wallace Was Hot. Each of the letters represents a different size-up factor. See Box 3-1.

## BOX 3-1: WALLACE WAS HOT

| | | |
|---|---|---|
| ***W***ater | ***W***eather | ***H***eight |
| ***A***rea | ***A***uxiliary appliances | ***O***ccupancy |
| ***L***ife hazard | ***S***pecial matters | ***T***ime |
| ***L***ocation, extent | | |
| ***A***pparatus/personnel | | |
| ***C***onstruction/collapse | | |
| ***E***xposures | | |

***Water*** Assuming that sufficient resources are available, water supply will dictate whether a fire can be controlled. Units should have a system to quickly determine hydrant location, size of water mains, drafting sites, or other sources of available water. If a hydrant system is in place, is there a sufficient number of hydrants supplied by adequate-sized water mains? Operations can be hindered when dealing with dead-end or undersized water mains.

Water supply and available pressure should be monitored. It may be necessary to have the water company increase the pressure on hydrant systems. There may be a private hydrant system available. In addition to their domestic hydrant systems, some cities have secondary hydrant systems that use ocean water or untreated river water to protect high-value districts and industrial areas. The salt in ocean water may cause damage to apparatus and, if used, flushing of the apparatus must be performed as soon as possible after use.

In non-hydrant areas water needs to be brought to the scene. If drafting sites are available, the use of large-diameter hose-lines, in conjunction with relay pumping, can ensure a continuous supply of water. (See Figure 3-7) Relay pumping allows the movement of water by using multiple apparatus to pump water from a source to the fire scene. The use of large-diameter hose-line can facilitate this operation. Relay pumping is usually performed when the available water supply at the incident scene is insufficient or nonexistent. The water source can be a lake, pond, or municipal fire hydrants. This operation demands organization and management to ensure the proper size hose-lines, sufficient apparatus, and their correct placement. The IC must realize the amount of time required to set up a lengthy relay and what effect this will have on the fire.

A water tender operation can be utilized when a remote water supply is used. A dump tank(s) is set up at the fire scene. The water tenders can quickly dump their water supply and return to the source of the water supply to refill. This quick release of thousands of gallons of water by multiple units can assure a continuous supply of water to be drafted by the pumpers at the fire scene. When implementing a water tender operation, the time involved and water available must be considered. Terrain, travel time (the effect of weather on road conditions), and access both to and from the fire area will determine the fire department's ability to ensure a continuous water supply for the fire scene.

***Area*** Knowing the size of the building and the exposed area will assist the Incident Commander in determining the amount of water needed for the potential fire flow. Area

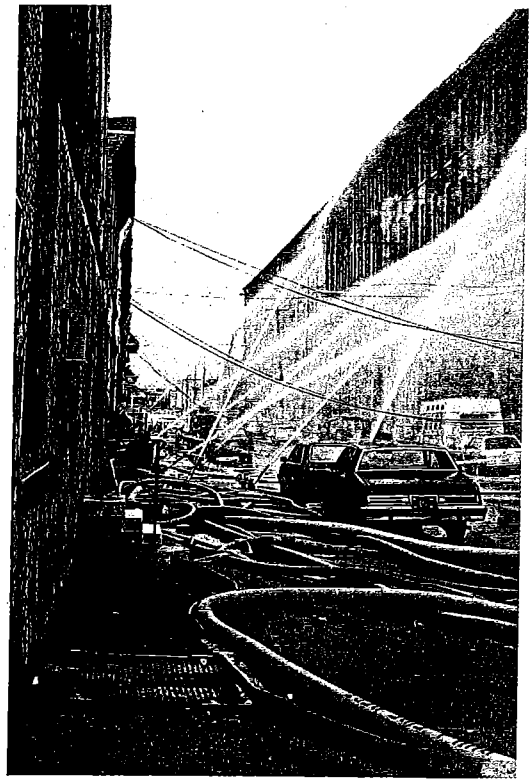


**FIGURE 3-7** Large-diameter hose-line can be utilized as an above-ground water main to relay water to the fire scene. *Used with permission of Joseph Hoffman.*

must consider the building's layout. It may be difficult to ascertain the size of irregularly shaped structures when located in areas of high building density. The fire building may be completely surrounded by other structures, severely impacting the IC's ability to do a 360-degree walk-around. In these situations, the preplan is invaluable. By referencing the preplan, the area of the building can be easily determined. Realize that the larger the structure, the greater the potential magnitude of the problem. The area involved in fire (as well as what is actually burning), where the fire is going, and what is in its path must be determined. By identifying these factors, the IC can determine the level of resources that will be needed.

***Life*** The most important factor of size-up is always life safety. Everything else is secondary. On arrival at an incident, the life factor must be determined. Who is in the building? What is their location? What is the most expedient way to protect or rescue them from danger? Can they evacuate themselves or should firefighters escort them out of the building? Do ladders need to be placed and rescues made? Immediately exposed occupied structures, spectators, and responding firefighters must all be considered. (See Figure 3-8) When operating at the incident scene, firefighters must wear full protective gear. This ensures a reasonable degree of personal safety during firefighting operations.

Trapped citizens have no protective gear, they are untrained to handle the stress associated with a fire, and they will most likely try to leave the fire building the same way they entered, regardless of the danger. The most endangered will be those in the immediate vicinity of the fire area and those directly above the fire. (Consideration must be given to everyone above the fire floor.) Ventilation and the placement of hose-lines must take into account fire confinement and protection of trapped occupants.

***Location*** The fire's location, intensity, and extent will dictate how the fire will be fought. Location will determine the possible travel of a fire. For example, in a cellar fire, all floors above are potential interior exposures. On the other hand, a fire occurring on

**FIGURE 3-8** Life safety of occupants and firefighters and the fire's location, intensity, and extent will dictate how the fire will be fought. *Used with permission of Joseph Hoffman.*

the top floor of a multistory building will not normally cause a severe interior exposure problem or threat to life on the floors below the fire floor.

Smoke can hide the location of the fire by banking down and permeating a building. Ventilation will remove pent-up combustion products and allow the incoming air to fuel the fire, assisting firefighters in locating it.

When dealing with a large structure or a complex of interconnected buildings, it is helpful to glean information from the preplan or have an engineer from the complex at the command post to answer questions. Knowledge of the location of fire walls and fire doors and whether they are kept closed will be useful in predicting fire spread and placement of units to contain the fire.

Narrow aisles, high-piled stock, and heavy smoke conditions can delay finding the seat of the fire, allowing it to expand. High ceilings can cause fires to go undetected for a longer period of time and allow fire extension. After the fire's location is identified, the best way to prevent it from spreading horizontally and vertically must be determined.

***Apparatus/Personnel*** Incident control can be assisted through the use of specific apparatus and personnel. It is important to consider which aerial equipment or special apparatus can be used for rescue, fire attack, or protection of exposures. This includes tower ladders, elevated platforms, ladder pipes, communications vehicles, fireboats, and lighting vehicles. When sizing up the area, the best use of a certain piece of apparatus should be determined so that when called, the unit can be given specific orders on the location to which to respond and the duties it is to perform. The quantity of water needed to control the fire and the ability of the apparatus pumps to deliver that amount must be considered. This information can be incorporated into the preplan.

What resources will be needed to control the incident? Departments with a large number of resources or those with strong mutual-aid agreements will be better able to handle large or unusual fires. When resources are limited, Incident Commanders must adjust their priorities to match what can actually be accomplished. When assessing the resources required, it is necessary to know the capabilities of personnel and equipment. Personnel ability is directly related to the level and amount of training received.

A request for additional resources to an incident, in the form of extra alarms, strike teams, task forces, or specific units, should be based on the current and anticipated conditions. The requested units responding can be utilized to:

- Accomplish a specific assignment
- Relieve units already operating at the scene
- Remain in Staging for anticipated problems

Some fire departments utilize different call signs for special apparatus. Philadelphia has multiple call signs for engine companies depending on the type of apparatus. Foam pumpers are assigned as front-line engine companies but contain a foam tank and additional cans of foam. Their call sign changes from Engine 18 to Foam 18. Squrts contain an elevating boom and their call signs are changed from Engine 38 to Squrt 38. Certain pumpers carry a greater amount of large-diameter hose-line and their call letters change from Engine 52 to Pipe Line 52. (This is a reference to pipe line companies that in the middle of the last century were special apparatus that carried larger-diameter hose-line for use at multi-alarm fires.) Engine companies with special monitors that are capable of delivering master streams exceeding 2,000 gallons per minute with reaches that far exceed standard master stream devices are identified as Deluge 49. Similarly, ladder companies also have special designations. The call signs for Tower Ladders or Snorkels are changed to signify that they are special apparatus. This change in designation allows the Incident Commander to know what special apparatus is responding. Should a company's special apparatus be out of service and it is responding with a reserve apparatus, then that unit's call sign would revert to Engine 38 or Ladder 28.

Career departments should have a method in place for recalling off-duty personnel. These members can provide additional staffing at the scene or staff reserve apparatus to provide coverage for those units operating at the fire.

Volunteer and combination departments should have a method of informing the Incident Commander of the number of firefighters responding with an apparatus. Some departments do not allow an apparatus to respond unless a minimum number of personnel are aboard. Other departments may respond with a driver only. The Incident Commander bases his or her strategies on the ability to perform specific duties and place a certain number of hose-lines into operation. These assignments require a minimum number of personnel. If the number of units called for does not supply sufficient personnel, the IC will need to summon additional units. One method of notifying the IC of responding staffing is for the company officer or engineer to announce to dispatch the number of firefighters aboard each unit as they acknowledge their response.

Personnel can also include resources needed from outside agencies. The astute Incident Commander makes good use of outside agencies to assist in commanding and controlling the incident. At a mass casualty incident, the Red Cross can notify the next of kin, assist them in securing transportation, and keep them abreast of the condition of their loved ones. The Red Cross can also set up temporary shelters and make housing arrangements for those displaced by fire or evacuation. The Environmental Protection Agency (EPA) will respond to incidents involving hazardous materials. It has the authority to initiate cleanup procedures and can engage private contractors to do so. There may be a need to call the Coast Guard, utility companies, police, public works, or other agencies that can assist in alleviating incident problems. Each agency can help in its specific area—for example, by shutting down endangered overhead power lines or closing down shipping lanes on exposed waterways.

When outside agencies respond to an incident and the Incident Commander is not familiar with all the potential resources of that agency, a good procedure is to have the Liaison Officer discuss with the representative what actions or resources that agency can provide to mitigate the current problems. Though ideally this information should be known in the preplan stage, in too many instances outside agencies have stood by and the potential of their agencies was not utilized due to the IC's lack of knowledge of their capabilities.

***Construction/Collapse*** Good construction practices assist in controlling a fire, while poor methods allow a fire to expand and spread from structure to structure. (See Figure 3-9)

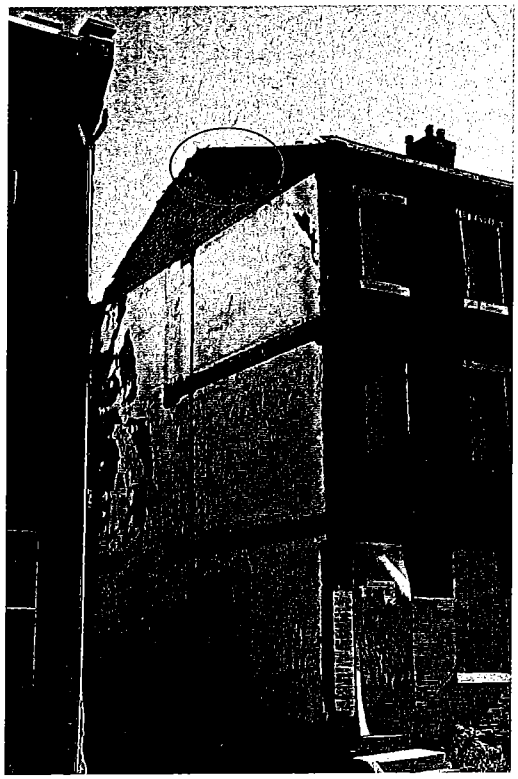


**FIGURE 3-9** This photo shows an opening that existed in the wall to the previously attached structure. The breakdown of a wall that is utilized as a fire-stop can allow fire to extend to an adjoining property.

A prime example of poor construction practices is the continued use of wood-shingled roofs in many areas of the country. They have proven to be one of the major reasons for conflagrations.

Plot planning that prescribes proper spacing of building lots and clear spacing between buildings can prevent fires from extending from one building to the next. Likewise, town houses erected with proper fire-stops offer firefighters a better chance to save a life, confine a fire, and preserve property. Each area of the country has specific types of construction germane to its communities. Efforts must be made to be aware of these methods and of how they can affect operations should a fire occur.

As fire attacks structural components, the potential for collapse must be a strong consideration for the Incident Commander. The type of building and the building components will vary, as will the collapse potential. The importance of knowing the strengths and weaknesses of the various building components is critical to firefighters. (See Chapter 5 on construction and Chapter 6 on collapse.)

***Exposure*** To predict the probable spread of the fire and thus develop a strategy, it is necessary to know what is in the fire's path that can burn. The exposure problem concerns two basic areas: internal and external. With internal exposures, contents in the immediate and adjoining areas must be considered. When dealing with exterior exposures, the direction in which a fire may spread and to which other structures must be considered. The extension of fire to another building will impact on operations and cause additional problems.

When deciding upon the most critical exposures, knowledge of construction, proximity, contents, threat, and life safety factors is required. Consideration of all factors is assisted by utilizing the preplan and available on-scene information.

What is the life safety factor in the exposed buildings? Schools, nursing homes, hospitals and other high profile target hazards that involve "at-risk" populations. The exposed buildings may contain hazardous materials. An explosion or a release of poisonous materials

could impact upon a large segment of the surrounding community. The construction type and the proximity of the exposed buildings can help in determining the severity of the problems that the Incident Commander will be confronted with. Attached structures or structures built with little spacing between buildings can be severely threatened because fire can extend from the original fire building to those attached. The spread of fire can occur due to:

- Interconnected or common areas; i.e., common attics, cocklofts, or cornices
- Floor and roof joists abutting in common wall sockets which could allow fire to extend to the exposed buildings by conduction through the joist
- A breakdown of fire-stops in concealed spaces

A fire occurring in closely constructed buildings may severely endanger nearby exposures. Wood frame dwellings with combustible siding will easily ignite under intense heat from the original fire building and possibly cause the fire to spread to other exposed structures.

Commercial buildings may be of ordinary or heavy timber construction with masonry exterior walls and wired glass windows. The wired glass windows will crack from high heat, but the glass will remain in place due to the wire imbedded in the glass. If the glass can be kept cooled with protective water lines, it will stay in place. At 1600 degrees Fahrenheit the glass will drop out and leave the window opening unprotected.

Some structures may contain exterior sprinklers that provide protection above the exposed windows. These sprinklers may function automatically or they may need to be manually activated. When activated they are highly effective and will provide a downward inverted "V" spray, protecting the window opening.

**ON SCENE**

In addition to individual sprinklers over exposed windows, larger areas of exposed buildings may receive exterior exposure protection from deluge sprinkler systems. In a warehouse fire that I commanded, fire had taken control of all floors of a large eight-story vacant building. On the "C" side was a 13-story fire-resistive building that was constructed in the 1950s for Bell Telephone located approximately 20 feet away. The architect designed an exterior deluge sprinkler system for the exposed wall. Fire impingement on the Bell Building was an early concern, and I assigned a second alarm company to pressurize the system. As fire lapped up the face of the building, the sprinkler system activated and knocked down the flames, fully protecting the building. This is an excellent example of how properly designed and functioning fire protective systems can be highly effective, even many years after their installation.

***Weather*** Temperature, wind, precipitation, and humidity can all play a part in an incident. Freezing weather can increase response times because firefighters will need to don extra clothing, and apparatus will be slowed if ice or snow is on the ground, increasing the chance of an apparatus accident. (See Figure 3-11) The impact of winter weather will hinder operations. Falls on slippery surfaces will slow and can injure firefighters. It becomes necessary to ensure that portable ladders are secure and not sitting on ice. Fire escapes and exterior stairs may be slippery and dangerous, necessitating more firefighters to affect a rescue. Freezing weather can cause hydrants to freeze or they may be hidden by snow.

During hot weather, some cities experience reduced hydrant pressure and water availability because of children illegally opening hydrants. Hot weather and high humidity will

**FIGURE 3-10** Exposed structures require the protection of cooling water streams. *Used with permission of Deputy Chief Thomas Lyons.*

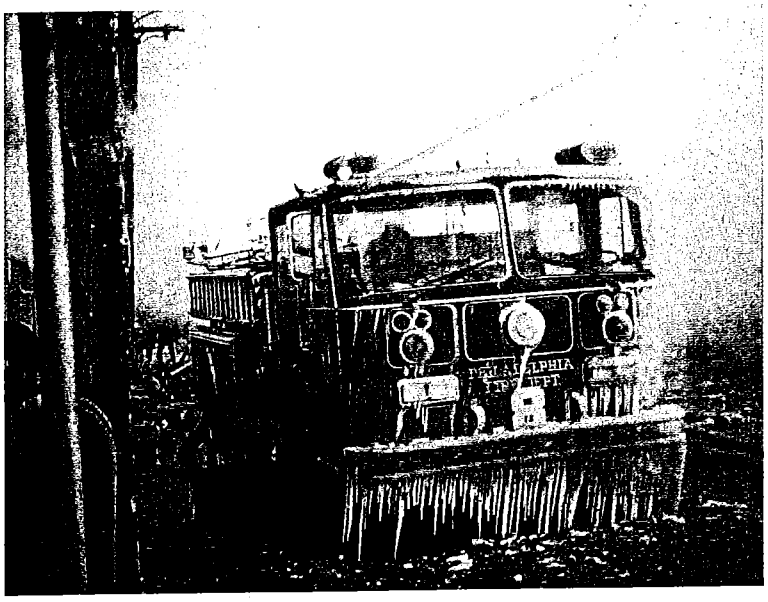


**FIGURE 3-11** Icy conditions can impact on fireground operations. *Used with permission of James H. Bampfield, Jr.*

quickly drain the strength of firefighters. Extreme heat means more frequent relief will be needed for the operating forces to maintain fresh personnel. If firefighters work too long under these conditions without adequate rest, they will reach a point of exhaustion and be of little use at the incident scene.

The speed and direction of wind often determines how a fire will travel and at what speed. High winds make for a fast-moving fire that is not only difficult to control but breaks down fire streams, decreasing their reach and limiting their effectiveness. Firefighters operating on the leeward side of a fire must be constantly aware of their dangerous position and be prepared to move to a safer location at a moment's notice.

***Auxiliary Appliances*** Auxiliary appliances are any built-in fire protection appliances present at the scene. There are a variety of suppression systems that can be

encountered: sprinkler, standpipe, $CO_2$, or even foam flooding systems at chemical or bulk storage plants. Know the different types of systems in place and determine how they can best be used. (Chapter 4 contains additional information on sprinkler and standpipe systems.)

***Special Matters*** Special matters cover everything from topography or urban interface when dealing with a wildland fire, to elevated highways, railways, or bridges. Remember that special matters can involve a multitude of areas. It is important to consider impediments that may interfere with a normal operation, such as:

- Excavations adjacent to a fire building that restrict access
- Narrow streets or alleyways
- The potential of a backdraft or flashover
- The need for medical aid and requests for the appropriate level of assistance, be it basic life support, advanced life support, or medical team response

***Height*** In any structure more than one story, height will be a consideration. The floors above the fire will pose a threat to life and mean possible vertical spread of fire. Attached or adjacent structures of equal or greater height must be considered as immediate exposures. A building of greater height can be exposed on an upper floor from radiant heat. Adjoining structures of greater height may have windows above the roofline that can be exposed should a fire break through the roof.

Moving firefighters and equipment to upper floors requires time, sufficient resources, and proper management. Some areas restrict the height of structures to be built in the community. This is based on the fire department's ability to safely protect the people living or working in a building. A common maximum height in many areas without aerial ladder trucks is 35 feet, which often coincides with the longest ladder carried by the fire department.

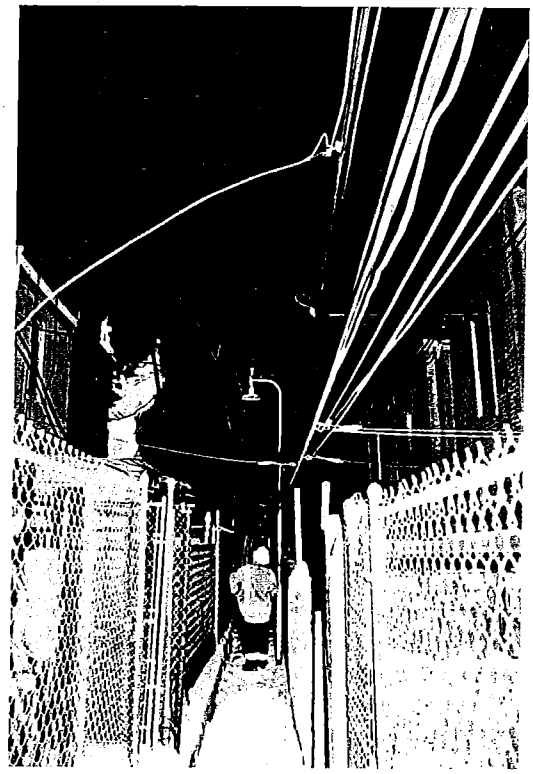


**FIGURE 3-12** Narrow alleyways, fences, and overhead electrical wires can hinder operations. *Used with permission of Joseph Hoffman.*

**FIGURE 3-13** Fences and other obstructions can limit access to the rear of fire buildings.

***Occupancy*** To know how to fight a fire, we must determine the contents of the fire building. Signs on the exterior of the building can be helpful. Highly combustible stock produces a high rate of fire spread, and certain manufacturing processes create situations allowing flash fires or rapid spread.

Contents can be high-value, such as items in a jewelry or computer store. Museums or libraries present special challenges to responding firefighters. Historic properties need to be identified and a value placed on them. Some structures have been fully restored and the building itself is the valuable asset that needs to be protected. In other cases the building has been rebuilt and the contents are the things of value.

There are a number of historic buildings in the Germantown section of Philadelphia that were involved in the Revolutionary War. In one particular property British soldiers carved their initials in the window glass. Should a fire occur in this structure, the firefighters would need to find other means of ventilation in order to protect the windows. Conversely, the Betsy Ross House where the first American flag was created is a structure that has been rebuilt and contains no historical significance, yet the furnishings are all authentic and need to be protected.

***Time*** A daytime fire in an office or commercial building presents a threat to the lives of employees working in the building, but it allows early discovery and (we hope) early notification of the fire department. The exception to this rule is when employees try to fight the fire themselves prior to notifying the fire department. Many fires that are costly in terms of loss of life and financial loss seem to be related to either delayed discovery or delayed notification of the fire department. A nighttime fire in the same building would present little threat to life with the exception of a skeleton crew and the responding firefighters.

Nighttime residential fires tax firefighters the most. Responding firefighters, realizing the life factor involved, give that extra effort. They go a little deeper into a structure and stay a little longer listening for the sound of a child in distress. Firefighters operating at

night encounter more locked doors, necessitating forcible entry. Darkness restricts vision, requiring the assignment of resources to illuminate the area.

Time of day can affect our response time. Delays must be anticipated during rush-hour traffic in and around our cities. Seasonal shopping can also delay response in and around shopping districts and malls. Seasons of the year can mean increased fire loading due to additional holiday stock or threat from specific fire dangers, such as wildland fires.

### ON SCENE

Situations can arise at a facility of which the fire department may not be aware. One evening, a battalion chief noticed approximately 1,000 children accompanied by adult guardians entering a planetarium with sleeping bags under their arms. A sleepover had been planned in the building as part of a science program. The panic of 1,000 people confronted with something as minor as a burning sleeping bag as they groped for an exit in the dark would have caused major problems for any responding department. The building was not meant to accommodate the campers, and the fire department had not been notified of the situation. An immediate inspection by the fire marshal set up ground rules to be followed for that night. The next day brought lengthy meetings to plan for future sleepovers.

***Size-Up Concerns Summarized*** Through size-up, we must attempt to learn:

1. Where is the fire located?
2. Is it confined?
3. Where is it going?
4. What is the life hazard to civilians and firefighters?
5. What is the type of construction?
6. What are the inherent dangers with this type of construction?
7. What are the fire conditions?
8. Is there a potential for a backdraft or flashover?
9. What are the immediate and long-term problems?

The answers to these questions assist the Incident Commander in the development of strategy and tactics.

Size-up is an ongoing process. When used properly, it assists in the handling of an incident scene. It is the basis for developing strategy and tactics. Size-up is not reserved for the Incident Commander only. Each individual operating at an emergency scene must perform it. As firefighters perform their various operations, they constantly have to be on the alert for situations that can arise or conditions that have changed. Changing conditions can mean danger for firefighters. Weakened floors, a sagging roof, or a raging fire in a void space containing lightweight structural components can be a threat to firefighter safety. When a proper size-up is performed, important points will not be overlooked and the incident scene will be run in a professional manner.

## Strategy, Tactics, and Tasks

Size-up identifies problems that we must solve through implementing the necessary strategies. The systematic deployment of strategy should be considered a tool and utilized along with knowledge, experience, and training. Knowledge is needed to evaluate the information gathered. Experience lets us draw upon actions that have been successful in the past. Training allows us to be proficient in the performance of our duties, eliminating unnecessary actions and quickly accomplishing **tasks**.

tasks ■ Stipulate who will do which step and when.

Unsatisfactory operations in one area can lead to an entire plan going awry.

Improper ventilation or no ventilation can stall or endanger a hose-line crew. Loss of water on a lower floor can allow a fire to accelerate and may necessitate the withdrawal of firefighters operating on the floors above.

Many firefighters group strategy, tactics, and tasks together. Strategy should be viewed as overall goals or *what* you want to accomplish. Good examples of strategies would be "rescue of trapped occupants" or "fire confinement."

Tactics can be viewed as *how* you are going to achieve your strategies or goals. If rescue were the strategy, then "performing a search and rescue of a fire area" would be a tactic to help achieve that strategy. If fire confinement were the strategy, "stretching a hose-line to confine the fire to a specific area" is an example of a tactic to achieve that strategy.

Tasks or actions stipulate *who* will do which step and *when.* To accomplish the aforementioned strategies and tactics, an example of a task is "Truck 1, on arrival, conduct a primary search of the second floor." This addresses the strategy of rescue and the tactic of performing a search and rescue of a fire area. It also states who will do the task (Truck 1) and when it will be done (on arrival).

Another example of a task is "Engine 1, on arrival, stretch an inch-and-three-quarter hose-line to the first floor via the front door and confine the fire to the rear rooms." This addresses the strategy of fire confinement and the tactic of stretching a hose-line to confine the fire, as well as who will do the task (Engine 1) and when they will do it (on arrival).

As you can see, we use our incident priorities as a basis for decision-making. We then review our size-up factors to determine the problems. We select the strategies to address the problems found. Then we determine the proper tactics and assign units to accomplish the tasks to resolve the situation.

### Level 3: Strategy

***RECEO-VS*** The seven basic strategies are referred to as RECEO-VS. (See Box 3-2) These letters stand for rescue, exposures, confinement, extinguishment, overhaul, ventilation, and salvage. Incident Commanders must prioritize their strategies based on the incident priorities. The strategies of rescue, exposures, confinement, extinguishment, and overhaul are in priority order of consideration at an emergency. Ventilation and salvage strategies can be implemented at various times. The initial strategy implemented may be ventilation, but a lack of resources may relegate salvage to a lesser role until the arrival of sufficient personnel.

### BOX 3-2: RECEO-VS

***R***escue
***E***xposures
Confinement
***E***xtinguishment
***O***verhaul
***V***entilation
***S***alvage

A critical point to remember is that an initial responder will basically be confronted with only four of the seven strategic considerations. *Rescue, exposures, confinement,* and *ventilation* will be the initial concerns. This is not to minimize the importance of extinguishment, overhaul, or salvage, but they will be considered either later in the incident when extinguishment and overhaul are accomplished, or when sufficient resources arrive to accomplish salvage. Limiting the initial considerations to these four areas assists the Incident Commander in decision-making. Let's look at each area.

***Rescue*** The consideration for rescue is where the occupants are and what is the best way to protect or rescue them. Can a quick extinguishment of the fire protect those who are still in the building? This is one of the most difficult things to determine. There can be a wealth of concurring or conflicting information. When a discrepancy occurs, the Incident Commander must quickly decide the course of action to take. If there is no on-scene information available, actions will be based on the probability that there are occupants, and search and rescue will be a priority. (Chapter 4: Company Operations has additional information on rescue.)

***Exposure*** Exposure protection considers the potential for extension of a fire to involve internal or external exposures. (See Figure 3-14) The protection of these areas is vital in containment and control efforts. What is exposed in adjacent areas? What is on the floors above? Can fire extend to these areas through open doorways or open stairways? Through air or light shafts? To adjacent buildings?

The importance of protecting exposures cannot be emphasized enough. Companies must enter and inspect all possible areas of fire entry and, when necessary, utilize a thermal imaging camera or open those areas suspected of containing hidden fire. With properties that are attached, common attics or cocklofts should be checked for fire spread. Some new fire officers mistakenly fear damaging the exposed property. In the absence of a thermal imaging camera they may be tentative about opening ceilings and walls to check for hidden fire. Experience teaches us when it is necessary to open an area: look for discolored or blistered paint, hot surfaces, or smoke pushing from moldings.

Once an attic or cockloft is opened, a thorough check should be made. Indications of fire spread should be sought. The presence of cobwebs is one indicator that there is no fire extension to that area. Explaining to the occupant the reason for the damage caused by opening areas where suspected fire may be hidden is an important duty after the fire.

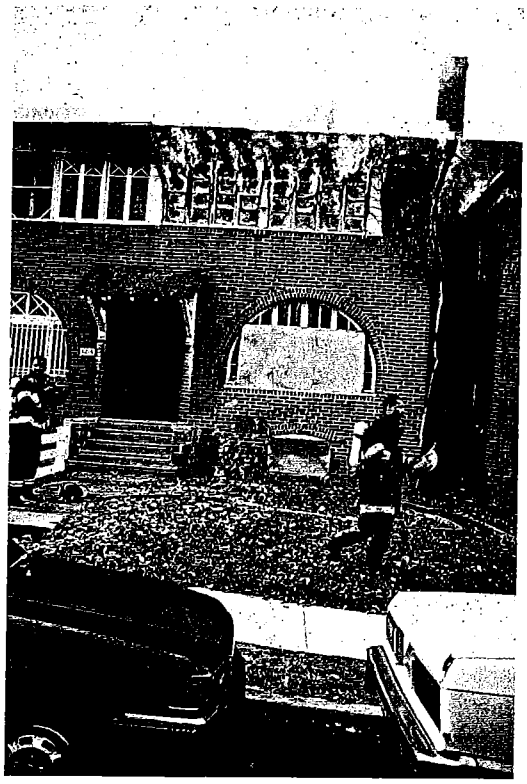


**FIGURE 3-14** A fire on the second floor is extending to the exposure on the Delta side of the fire building. *Used with permission of Joseph Hoffman.*

***Confinement*** The goal is to confine the fire to as small an area as possible. The exact location and extent of the fire may be difficult to determine. The path it will most likely travel must be considered. This allows the Incident Commander to predict what problems must be overcome to achieve confinement. Determining these factors will dictate the number of hose-lines and their placement. Orders can be given to shut fire doors, supply sprinkler systems to augment them, and check for extension of fire. The attacking of a fire in a single room or small area often accomplishes both confinement and extinguishment at the same time. (Chapter 4 Company Operations has additional information on confinement.)

***Extinguishment*** Extinguishment involves knocking down all visible fire and hidden fire exposed during the overhauling stage. Extinguishment calls for the judicious use of hose-lines. Indiscriminate use of water causes needless damage. When a fire has been controlled, sprinkler systems should be shut down and minor spot fires can be handled with handheld hose-lines. (Chapter 4 Company Operations has additional information on extinguishment.)

***Overhaul*** Overhauling ensures that all fire has been extinguished. Areas where fire could extend must be checked with a thermal imaging camera or opened and checked. Smoldering contents must be removed to the exterior. The overhaul stage is a critical step in complete extinguishment. When poor overhauling techniques are used, rekindling can occur.

Overstuffed furniture that has been involved in fire should be removed to the exterior and thoroughly wet down. Deep seated fire burning in a mattress, overstuffed chair, or sofa is difficult to fully detect. Leaving these furnishings within the fire building can often lead to rekindles. Realize that these items are damaged and of no use to the homeowner and will need to be replaced, so the fire department is doing the occupant a service by removing them to the exterior.

Electricity should be shut down to any damaged circuits. Other utilities should be shut down as necessary. Fire protection systems should be restored. Overhauling operations also involve determining the cause of the fire. Telltale signs of origin and cause can be uncovered. If arson is suspected, fire investigators may request special assistance during their investigation. (Chapter 4 Truck Company Operations has additional information on overhauling.)

***Ventilation*** Ventilation and salvage are utilized whenever they are needed during the course of firefighting and not at one set juncture. Ventilation allows intervention of hose-line crews to effect extinguishment and reduce damage. Ventilation may be performed during the rescue stage to draw fire and smoke away from a trapped occupant. (Chapter 4, Truck Company Operations has additional information on ventilation.)

***Salvage*** Salvage lessens the amount of the loss by protecting items from damage caused by smoke and water. The structure should be left in as good a condition as possible, considering the seriousness of the fire itself. Salvage can start as soon as enough personnel are available and the area is safe to operate in. (Chapter 4, Truck Company Operations has additional information on salvage.)

**Level 4: Tactics**

Tactics achieve the selected strategies. Tactics are *how* you are going to achieve the strategies. If ventilation is the intended strategy, then the tactic could be "horizontal and vertical ventilation over the fire area." Multiple tactics may be needed to achieve a strategy. For example, to enter the building for confinement or search and rescue, it may be necessary to use forcible entry, place ladders to upper floors, or stretch hose-lines.

To determine when tactics have been accomplished, it is necessary for them to be measurable and specific. To give the order "place water on the fire" is vague and could be improperly accomplished by placing a stream through a window. It is better to give the order "place the hose-line in the first floor and confine the fire to the area involved." The person giving

**FIGURE 3-15** Heavy fire conditions on arrival demand the immediate request for additional resources. *Used with permission of Greg Masi.*

the order will know when the hose-line is in place and the fire is confined. The achievement of tactical objectives will depend upon on-scene conditions and resources available.

**Level 5: Tasks**

Tasks or actions are implemented by giving orders to the units that will carry out the tactical operations. Tasks describe *who* is going to do a task and *when* they will do it. The Incident Commander (either a company officer or chief officer) must decide whether there are sufficient resources to handle the current and anticipated problems. This assessment must include the resources needed at the present time and those that may be necessary for future incident control. How many companies will be required for relief? One word of caution: Many times at an incident scene, it is recognized that the fire will require numerous additional resources (a minimum of a third or fourth alarm or, by comparison, eight to ten more companies). If all the resources are called for immediately, standard operating guidelines must dictate that the units proceed to Staging unless given specific orders en route. This prevents companies from determining their own course of action, alleviates congestion on the incident scene, and ensures that units address the strategy developed by the Incident Commander.

Constant reevaluation of the incident is necessary to ensure that the strategy, tactics, and tasks are accomplishing the goals of the IC. If not, adjustments will need to be made to reach those goals.

## AN EXAMPLE OF IMPLEMENTING THE STRATEGIES, TACTICS, AND TASKS

There should be a flow to an incident scene. If we arrive on the scene of a two-story frame dwelling at 0200 hours with a car parked in the driveway, fire visible through the first-floor windows, and an occupant at a second-floor window, with moderate smoke conditions throughout the building, how would we handle this situation?

First, we establish the strategies. If people are trapped, then an initial strategy (*what* we want to do) will be rescue. The next step is to see which tactics (*how* we are going achieve the rescues) will be needed to accomplish the rescues. More than one tactic may be needed to achieve our strategy. In this instance, when a person is reported trapped on the second floor, it may be necessary to implement search and rescue procedures to locate the victim or other victims. Forcible entry or laddering the building may be required. Another strategy would be confinement. One possible way to accomplish confinement is by preventing the upward spread of fire via the interior stairs.

If ventilation is identified as a strategy, then a decision on the best method of ventilation should be made. The tactic could be to employ horizontal, vertical, or positive pressure ventilation. (Though ventilation is a strategy, it can also be implemented as a tactic.)

Now that we have established *what* we want to do, or our strategies, and *how* we want to do it, our tactics, we then implement our tasks. This will involve *who* will do the tactic and *when* it will be accomplished. Typical orders could be:

To achieve rescue: "Truck 1, on arrival, provide forcible entry of the front door and perform a right-hand search of the second floor. Truck 2, on arrival, place portable ladders to the second floor windows for possible rescue."

To achieve confinement: "Engine 1, on arrival, stretch an inch-and-three-quarter hose-line via the front door and contain the fire to the first floor."

To achieve ventilation: "Truck 2, on arrival, perform horizontal ventilation of the first and second floors to support fire attack and search and rescue operations."

To see this graphically, refer to Box 3-3.

## BOX 3-3: STRATEGY, TACTICS, AND TASKS

| STRATEGY (WHAT) | TACTICS (HOW) | TASKS OR ACTIONS (WHO & WHEN) |
|---|---|---|
| Rescue | Implement search and rescue procedure | Truck 1, on arrival, perform a right-hand search of the second floor. |
| Confinement | Forcible entry | Truck 1, on arrival, force the front door. |
| | Contain fire to 1st floor | Engine 1, on arrival, stretch a 1-3/4-inch line via the front door and contain the fire to the first floor. |
| Ventilation | Horizontal ventilation of the first and second floors | Truck 2, on arrival, ventilate via the windows on both floors. |
| | | Truck 2, on arrival, place portable ladders to the second-floor windows to support the search and rescue crews. |

The sequence in Box 3-3 shows the flow of utilizing the command sequence. It is an excellent training tool. The actual decisions needed for the tactics and tasks are not all made by the Incident Commander. In actual use, the decisions on the type of search or location of ground ladders, for example, will be made by those accomplishing those tasks.

## SUCCESSFUL OPERATIONS

Through strategy, tactics, and tasks, we achieve our goals as determined by the incident priorities. Attaining these actions can be demanding. The initial Incident Commander may be faced with limited resources. Minimal information on the status of the occupants or the location of the fire may be available and time constraints may prohibit the confirmation of this data. The demands of the scene must be prioritized to ensure the maximum utilization of available personnel.

The development of strategy will be predicated on the available resources. Strategy can be accomplished in different phases. Certain actions can be achieved with the limited resources initially available. When adequate personnel arrive, implementation can be expanded to address all aspects of the incident action plan.

Strategy and tactics are not an exact science. We cannot say that if a certain problem arises, the solution will be handled by plan A or if another situation develops, then plan B will be the answer. We must constantly reevaluate the situation. We must learn from our mistakes and try never to make the same mistake twice.

## APPLYING INCIDENT MANAGEMENT TO SOLVE PROBLEMS

After we have identified problems through size-up, we can solve those problems with our strategies, tactics, and assignments of tasks. The next step that should be a natural progression at an incident is the implementation of an incident management system. The Strategy Prompter is a tool that can be useful to achieve that goal. By utilizing the strategies necessary to bring an effective solution to the problems found, we can also determine how our incident management system should be structured. (See Figure 3-16)

Let's continue with the same scenario of the two-story frame dwelling at 0200 hours with a car parked in the driveway, fire visible through the first-floor windows, and an occupant at a second-floor window, with moderate smoke conditions throughout the building. Let's assume that three engines, one truck, one squad, and one chief are responding. Each engine and truck company has four personnel, and the squad company has two

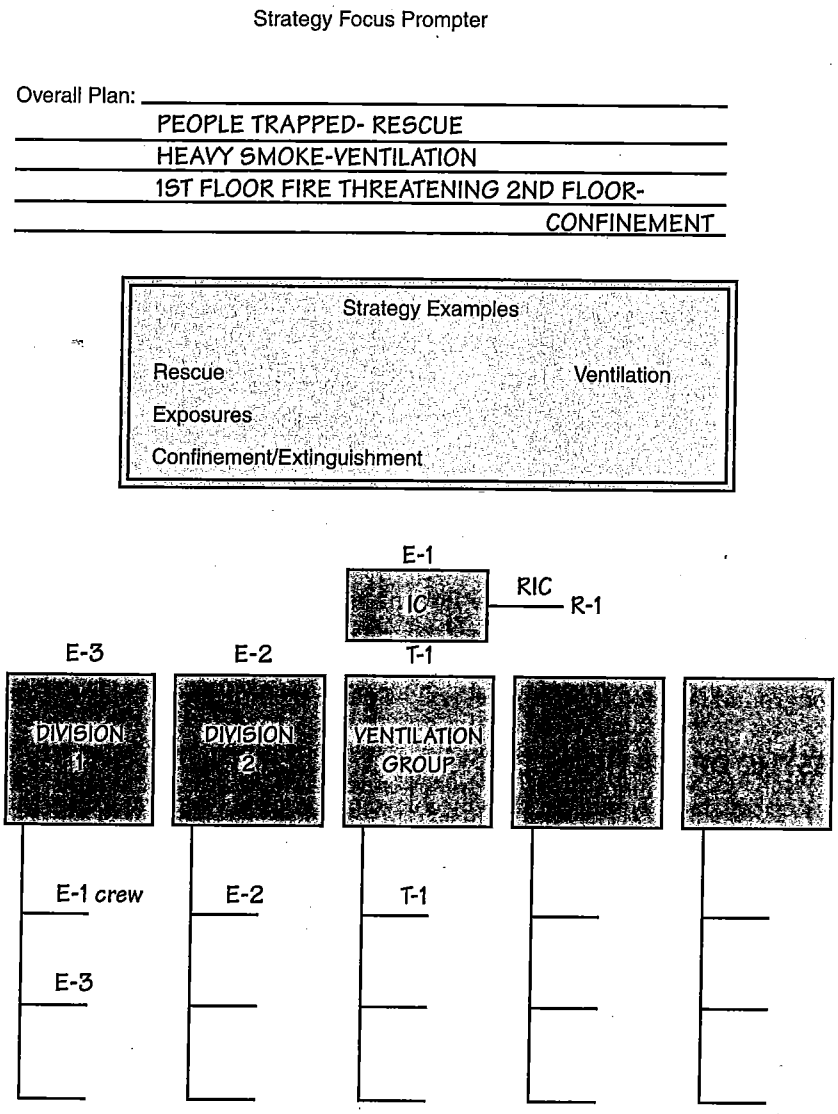



**FIGURE 3-16** Problems that are identified can be solved by our strategies. Implementation of a command structure that will address those goals is the next step and can be easily accomplished by using the Strategy Prompter.

firefighter/EMTs. With these facts, we can go to the next step, which is developing our incident management system. Earlier we identified the strategies that needed to be implemented: rescue, confinement, and ventilation. Our incident management system might look like this:

- The officer of Engine 1 on arrival will assume the role of Incident Commander.
- Engine 1's crew will operate in Division 1, indicating that they will operate on the first floor and accomplish all tasks needed there, including fire confinement and search and rescue.
- Engine 2's officer will become Division 2's Supervisor with Engine 2's crew. Division 2 will perform search and rescue, check for extension of fire to the second floor, and conduct any other duties needed on the second floor.
- Engine 3's officer will become Division 1's Supervisor with the crews of Engine 1 and Engine 3.
- Truck 1's officer will become Ventilation Group Supervisor with Truck 1's crew. The Ventilation Group will effect the ventilation necessary at the incident.
- Squad 1 will become the Rapid Intervention Crew.

When the chief officer arrives, the chief can assume Command or permit the officer of Engine 1 to retain Command.

As you can see, by identifying the needed strategies, it becomes a natural progression to initiate our management system to handle the problems found. The actual unit assignments may vary. Naturally, there are other ways that the management system could be structured to handle this assignment. Some departments may form a Suppression Group, a Search and Rescue Group, and a Ventilation Group. Because of the small size of the structure, another method that could be used is to assign only an Interior Division or a Division 1 and a Ventilation Group. As you can see, there are many right ways of implementing the management system. The important points to note are:

- The Strategy Prompter can assist in the quick development of a management system, and by using Divisions and Groups from the beginning, additional units can be assigned quickly to those Divisions or Groups as needed.
- The Incident Commander, by speaking to a maximum of three individuals (the supervisors of Division 1, Division 2, and Ventilation Group), can get immediate progress reports and maintain a manageable span of control.

## Crew Resource Management

**Crew Resource Management** (CRM) was implemented by the airline industry to optimize a crew's interactions at times of high stress. It was found that human error was the cause of most airline accidents. The airline industry recognized that in a number of airline crashes, members of the flight crew knew that problems had developed and, in fact, had brought the problem to the captain's attention, only for him to not act on it. CRM was originally called Cockpit Resource Management, but was changed to Crew Resource Management to incorporate all members of the flight team. CRM uses training to ensure the members of the flight crew are bold and assertive so that the captain, who has the final say, gets the critical information and crew input for safe flight operation. This input can come from the first officer, flight attendants, maintenance personnel, or air traffic controllers. The implementation of CRM has drastically reduced airline disasters from 20 a year to around one to two per year.

**crew resource management** ■ Is a tool created to optimize human performance.

CRM recognizes that humans behave predictably and if certain behaviors are learned and practiced, operations can be made significantly safer. It can be seen as knowing and understanding what is going on and knowing how to react to certain situations. The program met with such success that it was adopted by the U.S. military and they too found it quite beneficial.

## AIRLINE CREWS AND FIRE SERVICE CREWS

Many NIOSH reports that investigated firefighter line-of-duty deaths have listed communication failures, poor decision-making, lack of situational awareness, poor task allocation, and leadership failures as contributing factors in those deaths. These were the same factors that were listed in numerous air crashes and led to the adoption of CRM by the airline industry. There are other numerous similarities between flight crews and fire company crews. Crews are structured with a leader or company officer. The crew/company works best as a team. They can spend many hours on non-emergency tasks, such as maintenance, prevention, and training, and then be dispatched to an incident and act quickly to address a life or death situation. Another similarity is that some crews/companies may work together quite often, while other crews/companies may be assembled on short notice.

## CRM IN THE FIRE SERVICE

With the number of deaths and injuries that occur yearly, the fire service can benefit from adopting CRM. As with the airline industry, the chief or company officer has the final say, but input from firefighters to their company officer or a company officer to a chief officer can be beneficial for everyone.

CRM is not management by committee. It is a tool created to optimize human performance by reducing the effect of human error through the use of all resources that are available. It is similar to the way many progressive fire officers have operated during their careers in which they have welcomed input from firefighters and fire officers alike. They recognized that multiple sets of eyes and ears as well as the experience of their personnel could only be beneficial.

An example of how CRM could be beneficial in the fire service could include:

- Input while on a response from the apparatus driver telling the captain that he is familiar with the building in which the fire is reported. It may be a day care center that his child attends. His knowledge may include the fact that the building is not sprinklered and is constructed of lightweight material.
- On arrival at the scene another firefighter notices smoke coming from the building's attic vents under pressure and sees flames at that location. He may recommend to the captain checking the building with a thermal imaging camera.

These minor statements may seem needless, yet they make up a body of information that the captain can use in his/her size-up. The viewing of the flames at the vent may have gone unseen by the captain as he was giving an initial report to dispatch. The verbalization of these factors ensures that what was seen by one is shared with the company officer. The captain can process the data that he/she has seen and that has been told to him/her. The captain can then deduce that children could still be inside the building, and that fire may be in the attic area of a lightweight-constructed building which will drive his/her decision making.

CRM is based upon 5 factors:

- *Communications*—focuses on speaking directly and respectfully
- *Situational awareness*—stresses attentiveness and the effects of perception, observation, and stress on personnel
- *Decision making*—stresses the amount of information needed to be able to evaluate the risk/benefit analysis at an incident scene
- *Teamwork*—the need and value of teamwork for successful and safe operations
- *Barriers*—recognizing the effect of barriers on the first four factors and how to neutralize them

The fire service can only benefit by learning more about CRM and implementing training for their personnel to improve incident operations while reducing firefighter

- Rapid Intervention Crew(s) (The level of protection of the crews must be equal to that of those operating within the hazardous areas.)
- Divisions on the exterior on Sides A, B, C, D
- Exposure Divisions (if needed)
- Medical Group or Branch
- First-Aid Stations

## Terrorism Incidents

A threat that now looms for civilians and responders is that of terrorism. Terrorists strike unsuspecting, innocent people and then claim victory over dead and maimed men, women, and children. The terrorist acts at the World Trade Center in New York City, the Pentagon in Arlington, Virginia, and the Murrah Federal Building in Oklahoma City are prime examples.

On September 11, 2001, concerted acts of terrorism were committed against the United States of America. Religious zealots acting as suicide bombers hijacked commercial airliners. (See Figure 10-12)

- 0846 hours: A Boeing 767, American Airlines Flight 11, with 92 people aboard hit between floors 93 and 99 of the 110-story One World Trade Center, the North Tower, in New York City. The impact of the crash and the ensuing fire fed by over 20,000 gallons of jet fuel weakened the steel supports, causing the building to collapse at 1028 hours.
- 0903 hours: A Boeing 767, United Airlines Flight 175, with 65 people aboard struck between floors 77 and 85 of the 110-story Two World Trade Center, the South Tower. The impact of the crash and the ensuing fire fed by over 20,000 gallons of jet fuel weakened the steel supports, causing the building to collapse at 0959 hours.
- 0937 hours: A Boeing 757, American Airlines Flight 77, with 64 people aboard struck the northwest side of the Pentagon in Arlington, Virginia. The burning fuel-fed fire caused the eventual collapse of a section of the five-story building, taking the lives of 125 occupants.
- 1003 hours: A Boeing 757, United Airlines Flight 93, with 45 people aboard crashed into a field in Shanksville, Pennsylvania, when hijackers were foiled by passengers in their attempt to inflict more damage.

**FIGURE 10-12** Ground zero. The devastation wrought at the World Trade Center disaster on September 11, 2001. *Used with permission of John O'Neill.*

The collapse of the World Trade Center towers occurred quickly. Within a span of 1 hour and 42 minutes, the 220 stories of the twin towers became debris in the street laden with bodies of occupants and would-be rescuers.

At 1725 hours, the rescue problem was complicated by the collapse of Seven World Trade Center. The 47-story office building collapsed due to the fire that had spread from the towers and collateral damage caused by the collapsing towers.

All seven buildings in the World Trade Center complex totally or partially collapsed. (See Figure 10-13)

The death toll from the attacks on the World Trade Center was 2,749, which included a staggering 343 firefighters—the largest single loss of life of firefighters in history. The attack on the Pentagon caused the deaths of 125 occupants and 64 passengers aboard the airplane. The crash of Flight 93 in Shanksville took the lives of the 45 people aboard the airplane. This one-day act of terrorism took 2,983 lives on American soil.

In the aftermath of the terrorist attacks on the United States of America, the president and Congress created the Department of Homeland Security (DHS). It became the third-largest cabinet-level federal department by merging 22 disparate agencies. Its mission is to protect the citizens of the United States from terrorism. There are many facets to its operation, one of which is to analyze threat information that is received by the various federal agencies in regard to terrorism. In utilizing this information, when the DHS receives information that a credible threat has developed that could impact the public, it will provide information to keep families and communities safe.

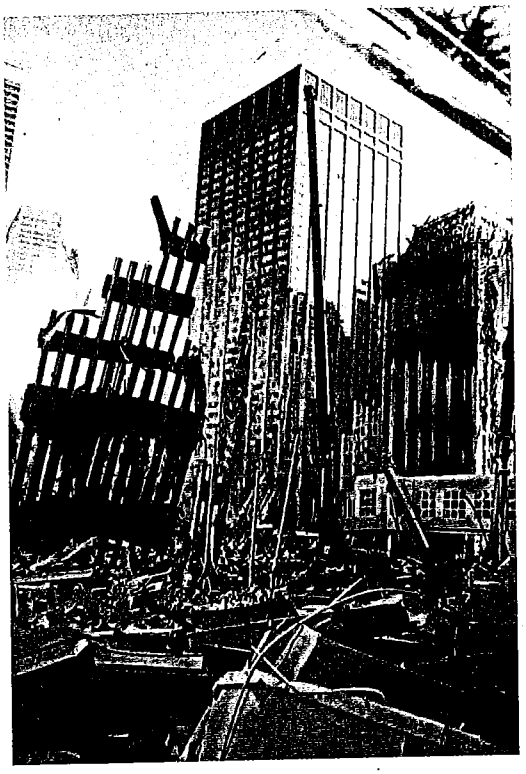


**FIGURE 10-13** All seven buildings in the World Trade Center complex totally or partially collapsed. *Used with permission of John O'Neill.*

## TERRORISM INCIDENTS VERSUS HAZARDOUS MATERIALS INCIDENT

There is a distinct difference between a hazardous materials incident and a terrorism incident. In the terrorism incident, the release has been done intentionally, and there is a strong possibility of the presence of secondary devices that are meant to kill or injure responders. At hazardous materials incidents, first responders often have the time to identify the involved material without immediately having to address mass casualties or mass decontamination. A terrorist response demands immediate actions to save lives and to try to limit the spread of a harmful agent.

The United States Department of Justice describes terrorism in part as "a violent act or an act dangerous to human life, in violation of criminal laws of the United States." The Federal Bureau of Investigation (FBI) recognizes two categories of terrorism:

a. Domestic
b. International

Domestic terrorism is classified as actions by those groups or individuals whose terrorist acts are directed at elements of our government or population without foreign direction.

International terrorism involves groups or individuals whose terrorist activities are foreign-based and directed by countries or groups outside the United States.

A terrorist incident will almost always include a criminal activity and technological hazards. The motives of the perpetrators must be determined. The amount of actual damage is a secondary concern of the terrorists. Their primary concern is the psychological

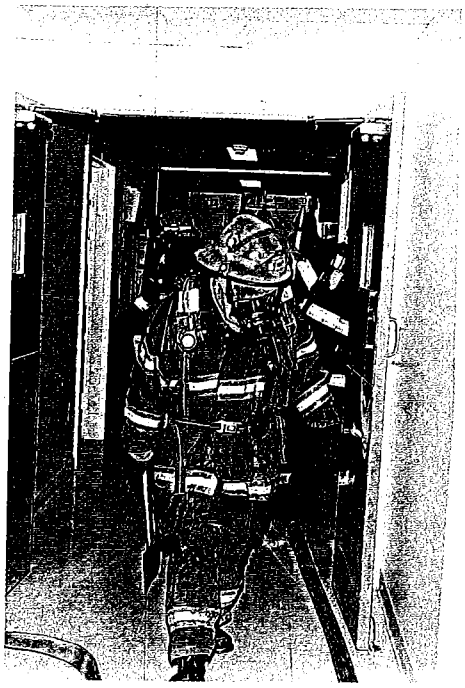


**FIGURE 10-14** Firefighters suspecting a terrorist incident should don all protective equipment to conduct their investigation. *Used with permission of Philadelphia VA Medical Center.*

impact of the attack. The claiming of responsibility for a terrorist act can give credibility to an extremist group by providing it autonomy through the media.

## WEAPONS OF TERRORISM

The weapons of a terrorist attack include armed attack; biological, nuclear, incendiary, chemical, and explosive weapons (B-NICE); and weapons of mass destruction.

### Biological

Biological weapons include bacteria, such as anthrax and plague, and viruses. These toxins can enter the body through inhalation or skin absorption. EMS and hospital personnel will often be the first to recognize the fact that biological weapons were used. They must immediately notify Command of this finding.

### Nuclear

A nuclear weapons attack is doubtful due to the enormous expense. A potential problem could exist if an attack occurred on a fixed nuclear facility with the intention of a nuclear release. Because the security is high at these facilities, this is probably a remote possibility.

### Incendiary

Incendiary weapons are economical and easily acquired. They are a favorite of some terrorist groups. They can be thrown or triggered remotely by chemical, electronic, or mechanical means. They can include flammable liquids, gases, combustible liquids, or a mixture of chemicals that will ignite on contact with each other. Unfortunately, this is also an instrument used in drug and gang violence and is something with which the fire service has experience. Differentiating between terrorism and other types of violence when incendiary devices are used will not be easy.

### Chemical

Chemical weapons include nerve agents, blister agents, blood agents, and others. With the exception of hydrogen cyanide (which is lighter than air), these agents are heavier than air and will tend to seek the lowest level. They will pool in basements and other low-lying areas. These chemicals attack the nervous system, skin, eyes, mucous membranes, and gastrointestinal tract. They include sarin, mustard gases, cyanides, arsenics, chlorine, and phosgene, among others.

### Explosives

Explosives are the choice for the greatest number of terrorist acts. They produce a pyrotechnic event that causes damage and frightens those exposed. The bomb can be quite sophisticated or as basic as a pipe bomb. Explosives can also be used to disperse other agents, such as biological, chemical, or incendiary weapons. If a bomb is used to disperse a chemical, it must contain a low-level explosive so as not to destroy the chemical agent.

### Airplanes

As witnessed on September 11, 2001, commercial airplanes were used as weapons of mass destruction. Of the four hijacked airplanes, three reached important targets resulting in many deaths and injuries. The Department of Homeland Security drastically changed the rules for air flight in the United States. In addition to increased security for boarding flights and increased baggage checks, air marshals have been trained and routinely accompany both national and international flights to guard against potential hijacking and other acts of terrorism.

## DISPATCHERS AND EMERGENCY OPERATORS

The roles of the emergency operator and dispatcher are significant for early recognition and identification of a terrorist event. Key information received can be critical. This would include verbal indications of:

- Multiple seizures in a public place
- Many people sickened in a public building
- An explosion in a public building
- A group claiming responsibility for a terrorist act at a location to which units have been dispatched but have not yet arrived

Dispatch centers must develop a list of questions to assist in identification of a terrorist event. Training for dispatchers should include signs and symptoms that could indicate the possibility of terrorism.

By developing a target hazard analysis, a list of locations or various types of occupancies could trigger a warning. These could include historic or governmental targets, airports, airplanes, places of assembly, or controversial occupancies (e.g., family planning clinics).

Special events during religious or governmental holidays could trigger assassination attempts.

If dispatch receives additional information about an incident, it is critical that it is immediately transmitted to the responding units.

## ACTIONS OF FIRST-ARRIVING FIRE OFFICER

As firefighters, we are put at high risk in responding to a terrorist act. The initial units will not be aware of what has occurred until a size-up has been completed. They must recognize the signs and symptoms of a chemical or biological incident. Unfortunately, the time it takes to complete the size-up may be sufficient to have already exposed some firefighters to harmful chemicals or secondary devices. Similar to radiation exposure, the best methods of protection are time, distance, and shielding. Akin to hazardous materials responses, time plays a major factor. Unlike hazardous materials incidents, the terrorist often targets the civilian population, compounding the firefighter's job because there will be a need for medical intervention, and the resources on scene will be overwhelmed.

The first-arriving fire officer must read the cues presented by the incident. The earlier the recognition of terrorist involvement, the faster safeguards can be initiated. As firefighters, our priority of life safety and wanting to make an immediate impact on saving lives cannot override the need to recognize obvious signs of terrorism:

- An unexplained number of sick, injured, or dead
- Extensive damage to a structure, property, or vehicles
- Unexplained damage over a wide area
- Mass hysteria due to nerve agents
- The presence of clouds or vapors
- Unusual packages or devices that could contain a secondary device
- Multiple victims with seemingly serious afflictions with no apparent cause
- Seemingly unusual conditions, things out of the ordinary, chaos
- Dead animals
- Unusual odors

Approach from uphill and upwind of the suspected area. Don all protective equipment. Attempt to cover all exposed skin. Set up a hose-line for immediate decontamination of firefighters after they exit the contaminated area. If any runoff is occurring, be aware of its direction.

Minimize the number of personnel in suspected areas. The fewer people exposed, the fewer problems with exposure and decontamination. Accountability of personnel must be in place, and they must be monitored for signs or symptoms of exposure.

Without advance information, if the terrorist act involves a biological weapon, it is highly likely that initial responders will become part of the problem. Fire units responding as a first-responder on a medical call can be affected. Not being clothed in personal protective gear and without self-contained breathing apparatus, they can be severely exposed. This exposure may involve delayed symptoms.

Large coastal cities may be more likely places for international terrorism, but the attack in Oklahoma City must act as a warning that domestic terrorism can happen anywhere.

The most effective actions are protection and decontamination of civilians and responders. The scene will be complicated if the initial responders become contaminated and sickened. The normal reaction of the next-arriving emergency personnel is to rush in and rescue everyone. This will compound the problem if the rescuers are not properly protected and trained to recognize the signs and symptoms of a terrorist attack.

Hot, warm, and cold zones must be established. Once zones are established, access to these areas must be controlled. Police play a vital role in supporting the scene. They should deny entry to unauthorized personnel. The cross-training of both hazardous materials units and bomb squads allows interaction and cooperation on joint operations.

## IDENTIFY THE TYPE OF AGENT

Is the agent chemical, biological, or an explosive? Identification of the agent should occur as early as possible. Initially, this may be aided by the signs and symptoms of those injured. The hazardous materials unit will need to determine the specific agents and concentrations. This will assist in the decontamination and emergency medical operations in treating patients. Identification will also assist in the search for evidence.

## SCENE CONTROL

Controlling the scene will be difficult. There is the potential for a mass casualty incident. Depending upon the type of attack, there can be massive injuries due to a bomb, for example, or complex medical injuries due to a chemical attack. A secondary device may exist that is meant to injure responders. Secondary devices may be another improvised explosive device (IED) hidden near the initial detonation, or a car bomb may be used as the initial IED and secondary or tertiary car bombs may be located near the initial blast to kill and disable responders. Police may have bomb-detecting dogs that can assist in finding a secondary device.

Medical personnel can be confronted with numerous people injured and pleading for assistance. Based on signs and symptoms, decontamination of victims may be required before medical personnel can intervene.

### ON SCENE

In January 1997, a bomb exploded at the rear of the Atlanta Northside Family Planning Service. A second bomb exploded about an hour later as emergency workers, including firefighters, were attempting to secure the scene and evacuate the area. These secondary bombs were placed to kill and injure paramedics, firefighters, and police.

## REQUEST ASSISTANCE

Determine the type and amount of assistance that may be needed. This includes:

- Hazardous materials teams
- Replacement protective clothing
- Air supply

- Medical teams
- Decontamination units
- Clothing for those decontaminated
- Communication equipment

Because local and regional resources will be overwhelmed, an early request for federal assistance will be needed. Realize that some governmental agencies require at least 12 hours to activate and then be transported to the scene. Even military units may require 6 hours of activation time. Recognize the resources available through mutual aid. Consider assistance from:

- Public health departments
- Public works departments
- Department of Homeland Security
- Federal Emergency Management Agency
- Federal Bureau of Investigation
- Bureau of Alcohol, Tobacco, Firearms and Explosives
- Other federal, state, local, and private agencies

## UNIFIED COMMAND

Operations will succeed if all agencies are working toward a common goal. This cooperation can occur only if established prior to the incident by conducting training and exercises that employ a unified command system. Each major agency will have a stake in the success of the operation. When the incident occurs, each agency's role should be identified. Without prior commitments and unified command, there will be turf battles and duplication of effort. Evidence may also be destroyed that could affect the arrest and conviction of the perpetrators. (See Unified Command in Chapter 2.)

## INTERACTION WITH POLICE

Incident scene safety and scene security are a must. If an armed attack has occurred, the police must assure scene safety by having the terrorists in custody or confirming that they have left the scene before firefighters enter the area. The scene should be thoroughly

**FIGURE 10-15** A tremendous number of resources responded to the World Trade Center bombing in 1993. It included multi-agency response from local, state, and federal agencies. The collapse of the towers in 2001 destroyed 89 fire department vehicles. *Used with permission of Steve Spak.*

checked for secondary devices by the bomb squad. The scene will need to be treated as a federal crime scene. The preservation of evidence can become a monumental task. At the Murrah Federal Building in Oklahoma City, each bucketful of debris was removed for examination. The level of evidence preservation must be discussed with the police prior to the event, and a plan must be put in place.

There have been instances in which police have allowed fire personnel to enter incidents where the police suspected foul play without notifying the firefighters of the potential danger. In at least one incident, the firefighters were pinned down by heavy gunfire. An exchange of information between the police officers and the firefighters can help to avoid these occurrences. Firefighters should not be subjected to hostile situations. Likewise, police officers should not be placed into areas where atmospheres have not been deemed safe to operate without proper protective clothing. Multi-agency exercises and training will help in eliminating these problems.

## DECONTAMINATION

Gross decontamination means removing the largest amount of contamination. This is accomplished by removing the victim's clothing, flushing the victim with water, and providing him or her with temporary clothing. The contaminated clothing will need to be placed in a bag, tagged, and kept secured to establish a chain of custody. The clothing may contain evidence needed for a criminal investigation. Secondary decontamination means a thorough rinsing with handheld hose-lines, decontamination showers, and possibly the use of a detergent or cleaning solution. The victim will then need to be clothed so that he or she can be transported to a medical facility for treatment.

Civilians who are suspected of being contaminated should be detained at the scene until decontaminated and medically cleared by EMS personnel. Allowing them to leave will spread the problem. Should they go to a hospital, the contamination will spread, and decontamination of the hospital will be necessary. If contaminated civilians come directly to the hospital, police and fire personnel should be dispatched to the hospital to set up a decontamination area.

Decontamination of protective equipment may require the replacement of that equipment. A problem that may result in the contamination of personal protective gear, including gloves and footwear, is that residual contamination left from exposure to a liquid can result in *off-gassing* (the dispersion of a product that was absorbed by a person's clothing) that could cause injury long after the incident is resolved. A procedure must be in place to provide replacements. This could be personal protective gear issued for temporary use.

There will be a need for separate decontamination sites for responders and civilians. (Decontamination is also discussed earlier in this chapter under Hazardous Materials.)

### Antidotes for Exposures to Nerve Agents and Cyanide

Acts of terrorism can expose firefighters to nerve agents or cyanide. To counteract these exposures, it is critical that medical personnel have access to antidotes to treat them. Each jurisdiction should mandate who has the authority to carry and administer these drugs.

Pralidoxime and atropine are the initial treatments for patients with symptoms of a nerve gas exposure. These drugs may be given as individual injections, but they are conveniently packaged in autoinjectors known as *Mark 1 kits*. Generally, one Mark 1 kit is used to treat mild or moderate symptoms and three kits are used for moderate-to-severe symptoms. The autoinjector is designed to be given intramuscularly through clothing directly into the thigh or buttocks.

Diazepam is used to treat or prevent seizures in patients. Diazepam may be carried in vials or in autoinjectors. Sodium thiosulfate is used to treat patients with symptoms that may be related to exposure to cyanide.

The dosage of the drugs to be administered and any additional treatment will be decided by the medical personnel at the scene.

The authority having jurisdiction must decide who should carry these kits or the individual drugs. In major cities these drugs should be kept on front-line apparatus and be readily available at an incident scene. In areas where the perceived threat is low, they can be kept in prepackaged caches at area hospitals so they can be delivered to the scene by a responding unit, or by an air ambulance.

## PERSONAL PROTECTION

Protection is critical. Firefighters, when operating in the hot zone, must wear their self-contained breathing apparatus. The wearers must allow a sufficient amount of time to exit the hot zone and be decontaminated before removing their masks. Otherwise, there may be residual contamination on the protective clothing that can be inhaled by the firefighters. After analysis of the scene, the hazardous materials unit may find that respirators with the proper filters will provide a sufficient safety factor for responders.

Firefighters must monitor coworkers and themselves for signs and symptoms of contamination. Personal protection means not becoming a victim. Having a firefighter become a victim complicates the problem. He or she will need to be treated, and this will diminish the treatment of civilians. A methodical assessment of the scene should be made. Do not touch, taste, or smell anything. These actions can lead only to problems. Firefighters should not make assumptions about what might have happened. If a problem exists, treat it. Be suspicious of events and act cautiously.

## STAGES OF RESPONSE

A community must be prepared to meet the threat of terrorism. This preparedness includes all agencies that would be needed to meet the various types of threats. A written set of procedures for terrorist acts is needed to guide responders at these complex events. The different stages of readiness could include:

### Stage 1 Alert

The alert stage is initiated in anticipation of a terrorist act. This phase is placed into motion because of intelligence from a police agency that has determined the credibility and the likelihood of a terrorist act occurring in the jurisdiction in the near future.

An alert stage will be implemented if:

1. A threat has been made
2. A threat has been confirmed
3. A previous threat that had been in the planning stage has been upgraded to a certain occurrence (a time frame in excess of 48 hours)

Implementation of the alert stage would set the following fire department events into motion:

- Evaluate available intelligence and develop contingency plans for stages 2 and 3.
- If available, issue body armor for each unit.
- Review station apparatus and security.
- Implement the necessary station training exercises to review the terrorism operational guidelines.

### Stage 2 Warning

The warning stage would be initiated if the event is likely to occur within 48 hours. The warning stage could be used if a neighboring community has been threatened and the potential exists of the same threat occurring in your community.

Implementation of the warning stage would set the following fire department events (as mandated in the department's written procedures or guidelines on terrorism) into motion:

- Set up a meeting of all agencies to review pertinent data for accuracy.
- Assign someone to keep abreast of current intelligence information.
- Establish channels of communications with mutual-aid and police agencies.
- Ensure staffing or increase staffing on selected units and at the dispatch center.
- Keep on-duty officers informed of developments.
- Keep on-call officers informed of developments.
- Set up a system to monitor all responses for possible developments.
- Be prepared to relocate units located in the affected area.

### Stage 3 Immediate Response

The immediate response stage would be implemented if there was no prior warning or intelligence indicating a forthcoming terrorist act. This stage will be the most difficult. With no prior warning, training procedures will be severely tested. If confronted with a B-NICE attack, responders will need to read the signs and symptoms of the scene.

Realize that as firefighters, the amount of information that the local and state police and federal authorities will share is minimal, if any. In many cases, their notification to local fire departments will be immediately prior to or after the start of a terrorist incident. If confronted with a B-NICE attack, EMS personnel, who will often be the first units on the scene, will need to identify the situation as a terrorist event.

Implementation of the immediate response stage would set the following events in motion:

- Confirm an actual incident and the type of attack (e.g., B-NICE).
- Determine the area of impact.
- Relocate any impacted units in the area.
- Notify all necessary on-duty and on-call personnel.
- Dispatch requested resources. (Realize that the amount of resources required will overwhelm most departments.)
- Restrict requests for other units in the impacted area unless approved by the Incident Commander.
- Alert mutual-aid and supporting agencies of implementation of stage 3.

### Stage 4 Recovery Operations

A return to normal is the last phase. It involves restoration of equipment and securing replacements for equipment that has been contaminated or used during the medical treatment of those injured. The obtaining of personal protective equipment must be done. Contracting for the disposal of the material used in the decontamination process must be completed. There probably will be a need for critical incident stress debriefing.

These incidents will be quite expensive, and the need to recover costs will be an essential part of the operation. This will require proper documentation throughout the incident. If the documentation has been followed properly, then determining which agency or jurisdiction will cover the costs can be dealt with later. The federal government will strongly support the recovery phase, with help from local governments.

## RESPONSE CONCERNS

Response to suspected terrorist acts demands alertness and caution. Safety of firefighters requires that we follow a judicious path. Treat each call as a true threat and wear the proper protective gear. Realize a terrorist group can be watching your actions and reactions to the false alarms to assist them in causing the most damage possible during an ensuing event.

## SIZE-UP FACTORS FOR TERRORISM INCIDENTS

### Water

- Terrorism incidents may require large volumes of water for decontamination or to fight a fire.
- Water can be used to disperse fumes or knock down plumes of chemicals being released.

### Area

- The affected area may be difficult to discern and could be quite large.

### Life Hazard

- Individuals can be exposed to explosions or harmful products that can threaten their health and safety.
- Look for indications of terrorist acts: multiple seizures, numerous sick people in one place, an explosion in a public building, or a group claiming responsibility as companies are responding to an incident.
- Responders should not touch or walk in any spilled product. Eating or smoking in the affected area could cause the product to enter the body. Full personal protective equipment must be utilized.
- Evacuation concerns will need to be considered. If a chemical was released, it may already be dispersed, or product and residue could remain.

### Location, Extent

- A fire could involve an extensive area.
- Hot, warm, and cold zones must be defined, constantly reevaluated, marked, and enforced.
- Extensive decontamination and cleanup may be required if there has been a chemical release.
- Do vapor clouds exist? Is there extensive property damage? Is there widespread damage?

### Apparatus, Personnel

- A multi-agency response will be needed. Additionally, the need for mutual-aid assistance could be tremendous.
- There may be an immediate need for EMS personnel for civilian casualties and emergency responders. A mass casualty situation could exist.
- Decontamination trailers will be needed to handle both civilians and responders.
- If a chemical is involved, the specialized knowledge of hazardous materials personnel may be required. A decision must be made whether initial responders can act to mitigate the situation or whether they must wait for the hazardous materials unit personnel.
- Decontamination must be set up before firefighters enter areas contaminated with dangerous chemicals.
- Sand, absorbents, or diking material may be needed.

### Construction/Collapse

- A terrorist attack occurring within or alongside a building can compound the problem. If a bomb has already detonated, the building may be unstable. Collapse must be considered.

### Exposures

- These incidents can involve the spread of toxic fumes or gases for great distances from the release site.
- Explosions may cause damage to nearby buildings.
- Acts of terrorism on public transportation (trains, subways, buses, etc.) can threaten many types of structures.

### Weather

- Dispatch should transmit the current and anticipated weather conditions to the responders.
- Rain can react with a spilled material, flush it into sewers or streams, or assist in diluting it. Wind can spread a plume of toxic material or assist in dispersing it. Cold weather can keep the temperature below a product's flash point and minimize vaporization. Hot weather can cause a material to reach or exceed its flash point, allowing ready vaporization.

### Auxiliary Appliances

- Sprinklers may be used to mitigate a spill or fire. Sprinklers may cause a runoff problem that will need to be addressed.

### Special Matters

- There is a possibility that secondary devices were placed to harm emergency responders.
- Are there dead animals? Are there unusual odors? Are there unusual conditions? Are there unusual packages that could be bombs or secondary devices?
- Water used for decontamination needs to be contained and disposed of properly.

### Height

- Acts of terrorism can occur within or outside of any building, although high-rise buildings with their many occupants are most vulnerable.

### Occupancy

- Terrorist acts will often occur in places of assembly or on modes of transportation where they will have the greatest impact and the potential for numerous injuries exists.

### Time

- The time of occurrence will most likely be when a large number of civilians can be affected, and it will cause a negative impact on emergency responders.

## STRATEGIC CONSIDERATIONS FOR TERRORISM INCIDENTS

### Strategic Goals for an Offensive Attack

- Obtain an assessment of the fire or incident area as soon as possible.
- When an assessment has been made, immediately call for additional resources, including EMS and other agencies that can assist.
- If a fire is involved, attempt to contain it to the area of origin.
- Determine whether the firefighters are qualified to handle the problem or whether hazardous materials technicians are needed.
- Evacuate occupants and have decontamination set up, if necessary.
- Perform search and rescue, if needed.
- Ventilation of a building may be required. Try to utilize the heating, ventilation, and air-conditioning unit to remove toxic fumes or smoke if you are assured that it can be sent directly to the exterior without contaminating other interior areas.
- Consider wind direction and velocity.
- Arrange for runoff water and decontamination water to be captured and disposed of properly.

### Incident Management System Considerations/Solutions for an Offensive Attack

- Incident Commander
- Unified Command (if needed)
- Safety Officer(s)
- Liaison Officer

- Rapid Intervention Crew(s) (The level of protection of the crews must be equal to that of those operating within the hazardous areas.)
- Intelligence/Investigations Officer
- Operations (if needed)
- Hazardous Materials Group or Branch
- Logistics
- Base
- Staging
- Ventilation Group
- Search and Rescue/Evacuation Group
- Division(s) (This could involve interior or exterior areas.)
- Medical Group or Branch
- First-Aid Stations

### Strategic Goals for a Defensive Attack

- If changing from an offensive to a defensive attack, ensure that a personnel accountability report (PAR) is taken.
- Reassess the hot, warm, and cold zones and adjust if necessary.
- Set up a collapse zone, if necessary.
- If using water streams, consider unmanned master streams.
- Protect exposures, if necessary.

### Strategic Goals for Nonintervention

- If it is too dangerous to attempt to mitigate the incident in a defensive mode, then all responders must be removed to a safe distance from the incident. The scene can be monitored from a distance via binoculars or unmanned monitors, and the fire, spill, leak, or secondary device allowed to run its course prior to allowing emergency responders to return to the scene. The bomb squad may assist with reconnaissance of the site by remote-controlled robots. This can take an extended period of time and should not be rushed.

### Incident Management System Considerations/Solutions for a Defensive Attack and Nonintervention

- Incident Commander
- Unified Command (if needed)
- Safety Officer
- Liaison Officer
- Public Information Officer
- Intelligence/Investigations Officer
- Operations
- Staging
- Logistics
- Base
- Hazardous Materials Group or Branch
- Rapid Intervention Crew(s) (The level of protection of the crews must be equal to that of those operating within the hazardous areas.)
- Divisions on the exterior on Sides A, B, C, D
- Exposure Divisions (if needed)
- Medical Group or Branch
- First-Aid Stations

## Dirty Bombs

dirty bombs ■ a "homemade bomb" that uses conventional explosives and contains radioactive material that is intended to be dispersed as the bomb explodes.

There are numerous types of terrorist events that could be directed against civilians and emergency workers. One serious threat is the detonation of a dirty bomb.

There have been no reports of a dirty bomb ever being used. An incident occurred in Moscow in 1995 where rebels buried a cache of radiological materials in Moscow's Ismailovsky Park. The press was notified and found cesium in a container partially buried. No explosion occurred and the device was removed.

In the United States, an American citizen was arrested in June 2002 in Chicago's O'Hare Airport on suspicion of planning to build and detonate a dirty bomb in an American city. The suspect was thought to have undergone training in the mechanics of dirty-bomb construction.

As with any type of emergency that visits our communities, it will be firefighters who will be on the front lines during the initial stages of an incident. This will place them in the line of fire, and their decisions and actions will assist in saving lives and in mitigating the problems found.

## NUCLEAR BOMB VERSUS DIRTY BOMB

There is a distinct difference between a nuclear bomb and a dirty bomb. A nuclear bomb involves a fission reaction. A dirty bomb is a "homemade bomb" that uses conventional explosives and contains radioactive material that is intended to be dispersed as the bomb explodes. A dirty bomb is referred to as a "radiological dispersion device." The concept is to blast radioactive materials into the area around the explosion. The intent is to cause damage from the explosive force of the bomb that can cause injury and death to those in the immediate area, and to expose people to radioactive material. The bomb's purpose is to frighten people and leave the buildings and land unusable for a long period of time.

A dirty bomb can be in the form of a pipe bomb, constructed from a paint can, or a large bomb that is assembled in a truck. The detonation device can be dynamite, plastic explosives, or ammonium nitrate. Any type of blasting cap attached to switches, timers, or cell phones can be used to trigger the bomb.

Another method of attempting to spread radioactivity may be placing a bomb on a vehicle or train containing radioactive material that when exploded will disperse the radioactive contents, contaminating the surrounding area.

## RADIOACTIVE MATERIALS

The radioactive materials that can be used in a dirty bomb can be obtained from military, industrial, or medical applications. Though weapons-grade plutonium and uranium would be most deadly, they are the hardest to obtain and the most difficult to handle. The most likely radioactive materials for these devices would be cesium, cobalt, and iridium isotopes. These materials are widely used for industrial applications in labs, hospitals, and factories. Typically there is minimal, if any, security and they can be easily obtained by theft. There have been reports of missing radioactive materials in both the United States and Russia. Terrorists would be receptive to the possibility of buying these materials.

Some experts have identified cesium-137 as the most likely radioactive element to be used in a dirty bomb. It is created as a byproduct of nuclear reaction. It has a wide variety of uses from treating cancer to maintaining atomic clocks. Cesium is the most reactive metal found. It easily attaches to many materials, including roofing materials, concrete, and soil. As cesium decays to a nonradioactive form of barium, the isotope emits gamma radiation. These rays are extremely difficult to contain. Only concrete, steel, or lead can keep gamma radiation in check.

Because radiation cannot be seen, smelled, felt, or tasted by humans, anyone at the scene of an explosion will not know if radioactive materials were involved.

## BOMB CONSTRUCTION

It takes little experience to assemble a dirty bomb. Other than knowing how to build a conventional bomb, the explosive is intended to disperse the radioactive material in

the bomb. The only restrictive part is acquiring and handling the radioactive material. Improper handling of this material would seriously endanger the bomb-maker. Though many terrorists are suicide bombers, high levels of radioactivity could sicken and kill anyone handling these materials.

A case that illustrates the danger of handling radioactive material occurred in Goiaina, Brazil, in September 1987. A worker found a discarded canister in a scrap yard that contained a sparkling blue powder that turned out to be radioactive cesium. Local residents found the powder very interesting and passed it from one household to another. More than 200 people were exposed to the cesium, resulting in four deaths. The radioactivity contaminated soil, businesses, and 85 homes that had to be leveled in the cleanup process.

## STRATEGIC CONSIDERATIONS

Dirty bombs are not intended for mass destruction, but more intended to cause economic destruction. It has been said they target mass disruption and panic, more so than mass destruction.

Responders should approach any suspected or confirmed bomb site with caution. Attempt to position personnel upwind and uphill of the site if possible. Once a bomb is detonated, size-up should be performed to assess the potential damage and threat to civilian and response personnel.

Ensure that all personnel utilize self-contained breathing apparatus or respirators to prevent the inhalation of radioactive dust that may be present. If a dirty bomb is suspected, establish hot, cold, and warm zones to protect firefighters and civilians. Any open wounds or cuts should be protected from radioactive contamination. Eating, drinking, or smoking should not be permitted while exposed to contaminated dust or smoke.

The immediate protection from any radiation exposure is time, distance, and shielding. The less time spent in contact with radiation the better. The farther away people are from the radiation the less their chances of being affected by it. Shielding, if available, will protect a person. Shielding can come in many forms including masonry, lead, and steel. Maximize the amount of shielding by using dense buildings between you and the bomb site.

When anticipating potential injuries with a dirty bomb, expect that few people will be subjected to acute doses of radiation in the short term. However, anyone remaining in the contaminated area will be subject to increased risk of developing cancer in the future. Since there is little immediate risk from the contamination, those near the dirty bomb should try and remain calm and exit the area. Panic could prove more deadly than the bomb.

Once a bomb is detonated, fire and bomb squad personnel should use radiation-monitoring devices to identify the presence or lack of radiation. These units should be kept in plastic bags to prevent their contamination. The monitoring devices should be used to identify areas of the highest dose rates. If radioactive readings are found, the Incident Commander must determine the need for personnel to remain in the area for firefighting or search and rescue. Areas of high dose rates should be avoided except to save lives, in which entry should be as brief as possible.

Firefighters can be equipped with individual alerting and monitoring devices to identify the presence of radioactivity. Some bomb squads have made it mandatory that each member wear an alerting device during investigations. Squads that utilize dogs to search for bombs have found that attaching an alerting device to their collars can reduce human exposures due to the early warning. Remote-controlled robots can also be fitted accordingly.

Once radiation is found, decontamination should be set up immediately and measures enacted to remove and replace contaminated clothing of civilians and response personnel. This will assist in eliminating the radioactive dust that may have accumulated on clothing. All clothing should be bagged for later disposal.

## ON-SCENE CONSIDERATIONS

Whether a bomb is intended strictly as a destructive device or as a dirty bomb does not alter the actions of firefighters and bomb squad personnel. Firefighters encountering situations where reports of explosive devices are suspected or found fall into two basic categories: exploded and unexploded devices. This differentiation determines the actions of the fire department and the bomb squad.

An unexploded device should be viewed as a police scene and should be left to the bomb squad and not be handled by firefighters unless they are specifically trained as bomb squad members.

With an unexploded device typical firefighter actions should be:

- Set up a safety zone around the suspected site. Maintain a clear zone of at least 500 feet from the location of the suspected device. This should be considered an exclusion zone that firefighters should not enter.
- Ready hose-lines to be placed into operation should the device detonate.
- Attach hose-lines to siamese connections that supply sprinkler and standpipe systems. Firefighters should be prepared to pressurize the systems if needed.
- Do not use cell phones and portable radios within the safety zone, since there is the possibility that radio waves could trigger the explosive devices.
- Establish communications with the dispatcher outside of the safety zone.

## NEEDS ASSESSMENT

An exploded device should be handled as a fire and hazardous materials situation. The need for fire control and rescue must be assessed. This includes determining building damage and the potential for structural collapse, and finding the safest way possible to accomplish firefighting and search and rescue.

Considerations must be given to the possibility of any secondary devices or the presence of radioactive material that would be contained in a dirty bomb. If a dirty bomb is suspected, then hot, warm, and cold zones should be established.

## PERSONAL PROTECTIVE GEAR PROTECTION

Typically the radiation that could be expected at the site of a dirty bomb would be reasonably low. A firefighter's personal protective gear and self-contained breathing apparatus would provide sufficient protection at low levels for a prolonged period.

Even at elevated levels, the firefighter's personal protective gear will permit operating within an area for a few minutes. This should be enough time to permit a primary search and the removal of injured civilians.

## FIREFIGHTERS EXPOSED TO RADIATION

Emergency exposures are usually allowed to exceed those tolerable to persons who work continuously with radioactive materials. In an emergency, such as a rescue operation, raising the exposure—within limits—for a single dosage is considered acceptable.

Rem is known as a unit of dose equivalence and is an acronym for *roentgen equivalent man*. One rem involves the same risk regardless of the type of radiation, but the dose required to produce one rem may vary depending upon the type of radiation.

For a lifesaving action such as search and rescue, the removal of injured civilians, or entry to prevent conditions that would injure or kill numerous persons, the planned dose to the whole body should not exceed 100 rems.

During less stressful circumstances, where it is still desirable to enter a hazardous area to protect facilities, eliminate further escape of effluents, or control fires, the recommended planned dose to the whole body should not exceed 25 rems. These rules apply to a firefighter for a single emergency; further exposure is not recommended.

## PROTECTING THE INJURED AND EXPOSED

If a dirty bomb has detonated in a public assembly building, firefighters must anticipate a mass casualty incident. Seriously injured people should be removed from the source of radiation, decontaminated, stabilized, and sent to hospitals. Those with lesser injuries can then be decontaminated, triaged, treated, and transported to hospitals.

After treatment of serious physical injuries, preventing the spread of the radioactive material or unnecessary exposure of other people is paramount. Carry out the following immediate response actions:

- Establish an exclusion zone around the source. This should be of significant distance to anticipate the spread of the radioactivity. It is easier to shrink the zone at a later time than to expand it.
- Mark the area with ropes or banner tape.
- Utilize police to control and reroute traffic.
- Limit entry to rescue personnel and strictly monitor each firefighter's exposure time.
- Detain uninjured people who were near the event or who are inside the control zone until they can be checked for radioactive contamination.
- Limit or stop the release of more radioactive material, if possible, but delay cleanup attempts until radiation protection technicians are on the scene.
- Notify nearby hospitals of the incident, the type of injuries involved, and the possibility of the arrival of radioactively contaminated and injured people.
- Check everyone near the scene for radioactive contamination.

Record-keeping is important for the long-term health of the victims and the emergency responders. Record contact information for all exposed people for future follow-up.

## CLEANUP OF RADIATION SITES

A dirty bomb that is detonated in a populated city will probably not be the cause of immediate deaths, but the resulting cleanup problem can be tremendous. The cleanup at radiation sites consists of removing the layers of contamination for disposal. This process can involve demolition of structures, sandblasting the faces of buildings that are contaminated, and removing soil. This material then must be properly disposed of, since it will be many years before the radioactive contamination will decay. In reality, radiated sites cannot be decontaminated; the material can only be transferred to another site.

## INCIDENT COMMAND ORGANIZATION

The complex situation created by a dirty bomb explosion will require that an incident management organization be initiated immediately. There will be the potential for establishing a Unified Command.

The typical response of the fire department and bomb squads will require close coordination. In addition to fire and police, many other agencies will respond and can be invaluable in the handling of the incident. These could include:

- Public works departments
- Health departments

- Companies to remove the decontamination materials
- Private waste cleanup companies
- American Red Cross
- County/state medical
- Mutual and automatic aid
- Environmental Protection Agency
- U.S. Coast Guard
- Federal Emergency Management Agency
- Military
- Department of Homeland Security
- Federal Bureau of Investigation
- Department of Defense
- Bureau of Alcohol, Tobacco, Firearms and Explosives

There will be numerous major functions occurring simultaneously that may dictate the need for Branches. These could include Medical Branch, Suppression Branch, Haz Mat Branch, and Evacuation Branch. Multiple operations in various areas can dictate the need for Groups and Divisions. They could include a Decontamination Group and a Rescue Group.

A major concern will be coordination between fire department units and the bomb squad members operating at the scene. Early consideration should be given to establishing a Liaison Officer. There will also be a demand for Information, Planning, Intelligence/ Investigations, and a Safety Officer to assist the Incident Commander(s).

## SIZE-UP FACTORS FOR A DIRTY BOMB INCIDENT

(These factors are very similar to a response to a hazardous material, yet some differences do exist.)

### Water

- An exploded dirty bomb may require an adequate water supply for decontamination or to fight a fire.

### Area

- The affected area may be difficult to discern and could be quite large.

### Life Hazard

- Individuals can be exposed to explosions or harmful products that can threaten their health and safety.
- Responders should not eat or smoke in the affected area. It could cause the radioactive product to enter the body. Full personal protective equipment must be utilized.
- Evacuation concerns will need to be considered.
- A firefighter's protective clothing with self-contained breathing apparatus or respirator will provide a measure of protection from radiation exposure.

### Location, Extent

- Utilize radiological meters to determine the extent of the contaminated area.
- An extensive area of property damage and contamination could require massive decontamination and cleanup.
- Hot, warm, and cold zones must be defined, constantly reevaluated, marked, and enforced.

### Apparatus, Personnel

- A multi-agency response will be needed.
- The need for mutual aid could be tremendous.
- There may be an immediate need for EMS personnel for civilian casualties and emergency responders.

- A mass casualty situation could exist.
- Decontamination will be needed to handle both civilians and responders.
- The hazardous materials unit personnel can assist in determining if radioactive elements were employed in the bomb.
- Decontamination must be set up before firefighters enter contaminated areas.
- Sand, absorbents, or diking material may be needed if there is a runoff problem.

### Construction/Collapse

- A terrorist attack occurring within or alongside a building can compound the problem if the bomb has left the building unstable.

### Exposures

- There is the potential for the spread of radioactive materials to nearby buildings.
- Explosions may damage nearby buildings.

### Weather

- Dispatch should transmit the current and anticipated weather conditions to the responders.
- Rain can cause radioactive materials to spread to other areas, including the sewer systems.

### Auxiliary Appliances

- Sprinklers may be used to mitigate a spill or fire caused by the exploding bomb.
- Sprinklers may cause runoff problems.

### Special Matters

- There is a possibility that secondary devices are placed to harm emergency responders.
- Check for unusual packages that could be a secondary device.
- Cell phone calls or radio transmissions could trigger an explosion.

### Height

- A dirty bomb can be detonated in or outside of any building. Naturally, a taller building will compound the fire department's problems.

### Occupancy

- Terrorist acts involving a dirty bomb can occur in places of assembly or on modes of transportation. The terrorist targets wherever it will have the greatest impact and the greatest potential for injuries and deaths.

### Time

- The time of occurrence will most likely be when a large number of civilians can be affected and it will cause a negative impact on emergency responders.

## STRATEGIC CONSIDERATIONS FOR A DIRTY BOMB INCIDENT

### Strategic Goals for an Offensive Attack

- Obtain an assessment of the fire or incident area as soon as possible.
- Once an assessment has been made, immediately call for additional resources, including EMS and other agencies that can assist.
- If a fire is involved, attempt to contain it to the area of origin.
- Determine whether the firefighters are qualified to handle the problem or whether hazardous materials technicians are needed.
- Evacuate occupants and have decontamination set up, if necessary.
- Perform search and rescue, if needed.
- Consider wind direction and velocity.
- Arrange for runoff water and decontamination water to be captured and disposed of properly.

### Incident Management System Considerations/Solutions for an Offensive Attack

- Incident Commander
- Unified Command (if needed)
- Safety Officer(s)
- Liaison Officer
- Intelligence/Investigations Officer
- Rapid Intervention Crew(s) (The level of protection of the crews must be equal to that of those operating within the hazardous areas.)
- Operations (if needed)
- Hazardous Materials Group or Branch
- Logistics
- Base
- Staging
- Ventilation Group Supervisor
- Search and Rescue/Evacuation Group
- Division(s) or Branch(es) (This could involve interior or exterior areas.)
- Medical Group or Branch
- First-Aid Stations

### Strategic Goals for a Defensive Attack

- If changing from an offensive to a defensive attack, ensure that a personnel accountability report (PAR) is taken for accountability purposes.
- Reassess the hot, warm, and cold zones and adjust, if necessary.
- Set up a collapse zone, if necessary.
- If using water streams, consider unmanned master streams.
- Protect exposures, if necessary.

### Strategic Goals for Nonintervention

- If it is too dangerous to attempt to mitigate the incident in a defensive mode (due to a number of factors, including the discovery of multiple unexploded devices in addition to the exploded devices) then all responders must be removed to a safe distance from the incident. The scene can be monitored via binoculars or unmanned monitors and the incident, or secondary device(s), allowed to run its course prior to allowing emergency responders to return to the scene. The bomb squad may assist with reconnaissance of the site by remote-controlled robots. This could take an extended period of time.

### Incident Management System Considerations/Solutions for a Defensive Attack and Nonintervention

- Incident Commander
- Unified Command (if needed)
- Safety Officer
- Liaison Officer
- Public Information Officer
- Intelligence/Investigations Officer
- Operations
- Staging
- Logistics
- Base
- Hazardous Materials Group or Branch
- Rapid Intervention Crew(s) (For surrounding structures. The level of protection of the crews must be equal to that of those operating within the hazardous areas.)
- Divisions or Branches on the exterior on Sides A, B, C, D

- Exposure Divisions or Branches (if needed)
- Medical Group or Branch
- First-Aid Stations

## Clandestine Drug Labs

clandestine drug labs ■ illegal laboratories ranging from primitive to highly sophisticated facilities for the production of illegal drugs such as methamphetamines.

The production, distribution and use of illegal drugs have a direct impact on public safety. Law enforcement agencies spend a tremendous amount of time and taxpayers' dollars in an attempt to police these illegal activities. Fire department responses caused by drug-inflicted problems reduce the available resources for firefighting and other emergency responses.

Large quantities of illegal drugs are produced in clandestine drug labs each year in the United States. Though this includes a variety of "designer drugs," in recent years 98% of the labs seized were manufacturing methamphetamine.

### METHAMPHETAMINE

Methamphetamine is a potent central nervous system stimulant that affects neurochemical mechanisms responsible for regulating heart rate, body temperature, blood pressure, appetite, attention, mood, and responses associated with alertness or alarm conditions. Most commonly it is found as a colorless crystalline solid. Impurities may result in a brownish or tan color. An impure form of methamphetamine is sold as a crumbly brown or off-white rock commonly referred to as "peanut butter crank." Other nicknames for methamphetamine are numerous and vary significantly from region to region. Some common nicknames include: "ice," "crystal," "meth," "crystal meth," "crank," "glass," "chalk," "tweak," "uppers," "black beauties," "glass," "bikers coffee," "methlies," "quick," "poor man's cocaine," "chicken feed," "shabu," "stove top," "trash," "go-fast," "yaba," "yellow bam,"and "speed."

A primary source of methamphetamine has been the "super labs" operating in the United States and Mexico, but the smaller drug labs account for the majority of the clandestine drug labs (CDL) seized in the United States. In a recent 10-year period, an average of over 11,000 methamphetamine laboratory incidents per year were reported to the United States Drug Enforcement Administration (DEA). The increase in the number of CDL is due to the ease of securing the chemicals and the fact that the equipment used is basic and unsophisticated. These incidents include labs, dumpsites, or chemical and glassware seizures. These clandestine drug labs present a significant threat to the health and safety of firefighters, police officers, and other emergency responders.

Public safety personnel face a high potential of acute and chronic health risks when involved in the seizure and handling of the products and residues of these labs. The public is likewise threatened by the potential hazards due to the volatility of the chemicals and the ensuing pollution from the waste that is produced. It is estimated that for every pound of methamphetamine produced five to six pounds of toxic waste is produced. This waste is discarded with no concern for environmental issues or the potential for exposure to children who may come in contact with it.

### METHAMPHETAMINE PRODUCTION

CDL are more dangerous than a legal laboratory or chemical manufacturing plant. Those facilities have safety equipment and procedures, fire-suppression measures, appropriate ventilation and chemical handling equipment on location. CDL range from primitive operations to highly sophisticated laboratories similar to those found in modern testing facilities.

Methamphetamine labs can be found anywhere in the United States in both urban and rural areas: in houses, barns, apartments, trailers, campers, cabins, motel rooms,

vacant buildings, and isolated wildland areas. The storage of the chemicals used in the production and their equipment may be kept in self-storage centers, and in a number of cases the production of methamphetamine has taken place in these rented self-storage centers. CDL may be located in remote areas to avoid scrutiny. Mobile methamphetamine labs have been found in trailers and vehicles as they drove down highways and through cities. The volatility of these processes is compounded when concocted in a moving vehicle and increases the possibility of explosions and fires. Those who manufacture methamphetamine are often harmed by toxic gases, especially when produced in the confines of a moving vehicle.

Those involved in the production of methamphetamine will go to extreme lengths to protect their territory. A serious concern is the presence of numerous guns that have been found in labs run by gangs. The guns are meant for protection from rival gangs, but criminals can easily turn them onto the firefighters to protect their identities and afford them time to escape before arrival of the police. Sophisticated monitoring systems may be in place in the labs, and the operation may be booby-trapped. Each clandestine drug lab is unique and presents a number of hazards. A large variety of chemicals could be present, most of which are highly flammable and toxic. The operator may be an experienced chemist who utilizes sophisticated equipment, or a novice who employs nothing more than primitive or makeshift devices. The operators of these illegal labs may be very astute in preparing the methamphetamine or can be operating from directions passed on to them from others, or from recipes found on the Internet.

The chemicals used in the manufacture of methamphetamine can generally be listed as containing dangerous characteristics, such as being flammable, explosive, irritants, corrosive, carcinogenic, water reactive, and causing rapid asphyxia. They can give off noxious gases and vapors. A specific concern exists if red phosphorus is used and it overheats due to improper ventilation. This condition can lead to the creation of large quantities of explosive gas.

The common methods of production of methamphetamine in the United States include:

- The "Red, White, and Blue Process," which involves red phosphorus, pseudoephedrine or ephedrine (white), and blue iodine.
- The "Birch Reduction" uses metallic sodium or lithium. The lithium is commonly extracted from non-rechargeable lithium batteries. This process is dangerous because the alkali metal and liquid anhydrous ammonia are both extremely reactive, and the temperature of liquid ammonia makes it susceptible to explosive boiling when reactants are added.
- Though less common, there are methods that use other means of hydrogenation, such as hydrogen gas in the presence of a catalyst.
- In recent years, a simplified "Shake 'n Bake" method was developed. The method uses chemicals that are easier to obtain, though no less dangerous than traditional methods. It is an easier, cheaper, and faster way to produce methamphetamine and can be produced in 30 minutes. A two-liter soda bottle is used along with crushed pseudoephedrine pills, and some household chemicals. The ingredients are placed in the bottle and shaken, resulting in a crystalline form of methamphetamine. This process can produce a powerful explosion, touch off intense fires, and release drug residue that must be handled as toxic waste. The instability of this process is evident because if there is any oxygen in the bottle, it has a propensity to make a giant fireball. Unscrewing the bottle cap too fast can result in an explosion. There have been numerous reports of flash fires and fatalities due to this process. Police have found it being made in moving vehicles. The plastic bottles, which can contain toxic, explosive, or flammable residual chemicals, are discarded.

## ON SCENE

Police in Tennessee found a driver passed out in his car at a gasoline pump. In the back seat, a batch of methamphetamine was actively cooking and going through a chemical process.

Firefighters in Texas fought a vehicle fire which was fully involved. Methamphetamine lab components were discovered in the charred remains.

Police in Georgia stopped a car for a routine traffic stop. As the officer approached the vehicle she noticed a strong smell of chemicals. A blender and a cooler were visible in the back seat and about a dozen electrical plugs coming from the cigarette outlet. A K-9 dog was alerted to the scent of drugs and a response from the DEA found hazardous materials and methamphetamine in the vehicle. The driver was manufacturing methamphetamine inside the car and was arrested.

In Kentucky, police pulled over a driver and found three separate containers of methamphetamine brewing in the car, one in the backseat and two in the trunk. A vehicle accident would most likely have been followed by an explosive release of the contents of the methamphetamine containers. The containers were dismantled by the DEA.

## CUES THAT CAN IDENTIFY A CLANDESTINE DRUG LABORATORY

There are cues that can assist in identifying a meth lab. Some of this information can come from size-up at an incident, while other information can come from complaints by neighbors who may have observed:

- Unusual, strong odors (like cat urine, ether, ammonia, acetone, or other chemicals)
- Excessive trash, including large amounts of items, such as antifreeze containers, lantern fuel cans, red chemically stained coffee filters, drain cleaner, and duct tape
- Unusual amounts of clear glass containers being brought into the home
- Windows blacked out or covered by aluminum foil, plywood, sheets, blankets, etc.
- Secretive/protective area surrounding the residence (like video cameras, alarm systems, guard dogs, reinforced doors, electrified fencing)
- Little traffic during the day, but high traffic at late night hours, including different vehicles arriving and staying for short periods of time

### Clandestine Drug Laboratories May Be Categorized As:

- *Active laboratory (hot lab):* One in which the chemicals and equipment necessary to produce an illegal drug are present, and a chemical reaction is taking place. Cooling by water, or heating electrically or by open flame, is frequently observed in active laboratories.
- *Inactive lab:* One in which the chemicals and equipment necessary to produce illegal drugs are present and assembled, but no reaction is taking place.
- *Abandoned lab:* Materials and equipment are present and disassembled. These materials may be stored in a dangerous manner and contaminated with unknown chemicals.

## PLANNING THE TACTICAL OPERATION

When a law enforcement agency receives intelligence of a CDL they should plan a tactical operation to seize the lab. This planning process is a police responsibility, and their assessment will determine which agencies should respond. The police agencies should have training in handling the associated hazards. If they have not been trained, they should contact the DEA to assist in the seizure of the laboratory. The fire department should have a representative present during the planning process to advise the police on the best utilization of the fire department's resources. The decision on how to proceed with the

seizure will be based upon the intelligence received on what the site contains. It could include active labs, inactive labs, abandoned labs, or chemical storage areas. Once this is known, the response can be based upon the degree of hazard anticipated. The factors involved will depend upon the location of the specific site, the amount and types of chemicals, and their concentrations and proximity to each other. The response to a CDL can include the bomb squad, DEA, fire department, hazardous materials unit(s), emergency medical personnel, and a hazardous waste contractor.

Safe operating procedures at a CDL for police operations would include:

- Avoiding the use of weapons or diversionary devices such as flash bangs, smoke, or tear gas canisters because they can ignite fumes present at the lab.
- Do not turn switches on or off; unplug "cookers," heating elements, or cooling equipment; open refrigerators or freezers; or move containers that are in the way, as they could be booby-trapped.
- Do not use matches or flames of any kind.
- Use an explosion-proof flashlight to look in dark areas.
- Do not taste, smell, or touch any substance.
- Do not eat, smoke, or drink at the site.
- Do not touch your mouth, eyes, or other mucous membranes with your hands.
- Decontaminate clothing, equipment, and personnel before leaving the laboratory site.

## INITIAL ENTRY TEAM

The purpose of the initial entry is to secure the scene and apprehend any and all suspects in the lab. The initial entry team must be specially trained law enforcement personnel who will secure the site as the arrests are being made. Because of the physiological/psychological side effects of methamphetamine abuse, users are often highly paranoid and may not be rational. Proper protection is required by the team, and their time spent in the lab should be minimal. Their back-up team or rapid intervention crew must be in place prior to the entry by the initial entry team. That team should be composed of DEA-trained law enforcement personnel and not fire personnel.

## ASSESSMENT

The assessment is carried out once the building has been secured through the arrest and/or evacuation of all occupants. The assessment is conducted by qualified personnel who have been certified in clandestine drug lab operations by the DEA. It should include law enforcement officer(s) and a forensic chemist, all who need to be in appropriate level of personal protective equipment (PPE). By sampling the atmosphere within the lab they will determine the explosive limits, oxygen levels, and the extent of toxins present. Their inspection will determine any immediate health and safety risks. Once readings are taken, identification of all chemicals and equipment present in the lab and the hazard that may exist will be performed. It will determine the air levels and whether air purifying respirators can be used in lieu of SCBAs.

## DEACTIVATION OF THE LABORATORY

Deactivation of the lab will be accomplished by law enforcement personnel and the forensic chemist. This will include fully shutting down any active cooking processes after thorough analysis to ensure safety of all responders. It can include closing valves on compressed gas, and ensuring that vacuum systems are properly shut down.

If necessary they will perform ventilation of the lab and surrounding areas after ensuring that windows and doors are not booby-trapped.

In addition to analyzing for the potential of fire or explosion, they will investigate for the presence of booby-traps on the premises. They are responsible for identifying,

documenting, and collecting physical evidence, including taking comprehensive photographs of the operation and the chemicals present.

The backup team or rapid intervention crew(s) requires the same protection as the assessment team. They may include either fire or police personnel, or a combination of both. Fire personnel are not required to be DEA-certified, as their responsibilities prohibit them from being members of an initial entry or assessment team. In the event of a fire and/or explosion, fire personnel assigned to backup safety teams will protect escape routes and make rescues if needed.

## BOOBY TRAPS

Booby traps can be well-disguised and are meant to counter an attack by anyone entering the lab. They can be intended for public safety personnel or for rivals intending to steal the contents of the lab. Booby traps may be set to destroy the evidence of the operation. The traps can be very basic or exotic and in the past have included:

- Attack dogs
- Poisonous snakes
- Trip lines to detonate chemicals or explosives
- Light switches that trigger flammable liquid containers
- Refrigerators or freezers triggered to ignite flammable liquids when opened
- Hydrogen cyanide gas generators
- Videotape cassettes that have been adulterated to explode when placed in a VCR
- Various explosives including contact explosives, which are made by combining potassium chlorate or red phosphorous with another chemical that becomes unstable when dried. The chemicals are rolled into a ball of aluminum foil and placed throughout the lab. If disturbed the ball will explode.

## POLICE REQUEST FOR THE FIRE DEPARTMENT AT A DRUG LAB SEIZURE

When through the course of everyday operations police discover a CDL, they will request assistance from other agencies including the fire department. The fire department response can include a chief officer, a hazardous materials unit, engine and truck companies, and emergency medical technicians, or paramedics.

Depending upon the command structure created, the fire department may become part of Unified Command, together with the police and DEA. However, because CDLs are primarily police matters, another possibility is for the law enforcement agency to assume the lead role as the Incident Commander and have the fire department act as an assisting agency. Regardless of the incident command structure, all activities of the Fire Department will be coordinated with the police.

## FIRE DEPARTMENT CHIEF OFFICER'S ROLE AT A CLANDESTINE DRUG LAB

The first arriving fire department chief officer will confer with the Police Incident Commander. Based upon whether the lab is active or inactive and the pertinent information available, he/she will:

a. Assist in determining the extent of the area to be evacuated.
b. Advise on the size of the boundaries between hot, warm, and cold zones.
c. Ensure that a sufficient number of hose-lines are stretched to unmanned monitors to adequately cover the property containing the lab and the exposures.
d. At the scene of an inactive lab, determine if a single engine response is sufficient for handling the incident. Although a chemical process is not taking place, a cold lab

should be considered dangerous due to the possible presence of unstable, flammable, or toxic materials.

The fire department chief officer, in conjunction with the hazardous materials officer, can advise the Police Incident Commander of the safety considerations necessary to protect all personnel and the general public. They can confer with the chemist and assist him/her in determining the appropriate level of protection necessary for the assessment and processing teams. They will confer with the Police Incident Commander in all decision making meetings to assure proper coordination between Police and Fire Departments.

### ON SCENE

Heavy fire that started on the first floor of a six-story heavy timber warehouse, 175 by 475 feet, quickly went to multiple alarms and a defensive attack. Fire doors were closed to stop the fire from running the entire length of the building and the tactic proved to be successful. The fire was contained to an area approximately 175 by 150 feet. As the defensive operations were underway all floors were heavily involved with fire and ground level and elevated streams were operating. An explosion occurred that created a tremendous white flash. Because there were heavy smoke conditions on the scene, it was difficult to discern exactly what had occurred. The brilliance of the white flash was similar to an electric arc, and at first I thought one of the fire department's elevated platforms had come into contact with overhead electric wires. I was immediately concerned for the safety of the firefighters on the platform. It soon became apparent that the explosion was from the sixth floor, and fortunately, its force was directed upward and not toward the platforms. An ensuing Fire Marshal's investigation found that a methamphetamine lab had been constructed on the top floor and was the cause of the explosion.

## HAZARDOUS MATERIALS UNIT

The hazardous materials unit officer will ensure that the members of the haz mat unit assist the police assessment and processing teams, in donning protective equipment, and conducting a safety inspection of same before the teams enter the lab. Police teams are required to have training in the use of SCBAs.

The haz mat unit officer should obtain data from the police entry team pertaining to the interior layout of the building. Information should be collected on the storage location(s) of chemicals, the location of the lab, stairways and exits, and any other unusual conditions. After acquiring this information, he/she will ensure that members assigned to backup safety teams are apprised of the same. The haz mat unit officer will determine the staffing level, the number of back-up teams, the proper level of protective clothing for those teams, and the number of water lines needed to safeguard police personnel operating in the lab.

The haz mat team will ensure that all teams exiting the lab undergo proper decontamination procedures.

No overhauling by the fire department should take place in a drug lab. Because drug labs are crime scenes, the preservation of evidence is important to ensure the arrest and prosecution of those criminals who are operating the lab. Only an approved cleanup contractor should conduct removal operations. This can involve the removal of propane cylinders that contain anhydrous ammonia, mercury, radioactive waste, explosives, and other chemicals that could be reactive with water or may react with other chemicals.

## MEDICAL RESPONSE TO A CLANDESTINE DRUG LAB

The response of medical personnel to a CDL will be dependent upon the jurisdiction. The minimum should be an ambulance with emergency medical technicians. Ideally, paramedics and an Emergency Medical Control Officer should respond if available.

They will be responsible for the pre- and post-entry vital sign monitoring for all members of the entry and backup teams. They will also assess, stabilize, and transport any injured and/or contaminated civilians and response personnel.

They will set up a triage area in the cold zone. The triage area should be in close proximity to the warm zone. Paramedics/EMTs will take vital signs of all Police and Fire Personnel who don fully encapsulated suits. Readings will be taken prior to entry, and again after exiting, and upon completion of decontamination procedures.

## FIREFIGHTERS ENCOUNTERING CLANDESTINE DRUG LABS

While CDLs pose the potential for a significant hazardous material release, they are, in fact, ongoing crime scenes. Approximately 30% of all methamphetamine labs discovered in the United States are found as a result of an explosion or fire. This fact alone shows the serious threat posed to firefighters. In addition to an explosion or a fire there are other instances when firefighters may locate a CDL during:

- Routine building inspections
- Responses to investigations for unusual odors
- A request for the fire department to respond to a medical problem
- An investigation of a building for fire extension, or for occupants during a primary search while working on a fire in an adjacent building, or another part of the building in which the lab is situated
- Emergency medical responses

## EMERGENCY MEDICAL RESPONSES

If a drug lab is found while on an emergency medical call, the fire department or ambulance personnel must leave the lab immediately. Victims in a drug lab may be overcome with fumes or have been burned. If possible, remove the patient if you can do so without being exposed to the hazardous chemicals that are present. Once the haz mat unit arrives, they will need to decontaminate the personnel, the patient, and all of the equipment that was carried into the lab. In cases where the patient needs an immediate response to the hospital, the hospital should be notified.

## FIREFIGHTERS' ACTIONS ON DISCOVERING A CLANDESTINE DRUG LAB

Should firefighters in the course of their duties discover or inadvertently enter a suspected CDL, whether active or inactive, they should consider the situation to be potentially explosive and toxic and:

a. Immediately notify the Incident Commander
b. If the CDL is in a motel, hotel, or other type of structure, the firefighters should try containment and immediately evacuate around, above, and below the involved area and possibly extinguish a fire.
c. If using water, utilize nozzles on fog patterns to minimize contamination and runoff.
d. If the building has been evacuated, immediately leave the building. Egress should be through the entry point. Do not open any additional doors. Do not touch anything. Always consider the possibility of booby traps.
e. Do not turn light switches on or off.
f. Do not touch suspected drugs, appliances used to manufacture them, or open refrigerators.
g. Do not unplug cookers, or heating elements, or tamper with their controls.
h. Do not disconnect or reduce the flow of water used for cooling.
i. Do not shut off any utilities.

j. Do not use thermal imaging cameras within these labs because they are not intrinsically approved for use in environments containing certain gases. They may be used on the exterior to identify areas of heat sources.
k. Keep your gear on and use a hose-line to gross decontaminate once outside.
l. Immediately notify the dispatcher of the discovery of the CDL and request the response of the police and/or drug enforcement task force if one is available.
m. As conditions warrant, relocate apparatus a safe distance upwind from the laboratory.
n. Have all responding companies report to an upwind staging area.
o. Consider the possibility that criminal suspects may either still be inside the property or in the immediate vicinity. Safety of members shall be of paramount importance at all times.
p. When police have rendered the area secure (e.g., free of suspects), assist in evacuating adjacent properties. If the lab is in an active stage, ensure that all fire department members are wearing full PPE and SCBAs.

Firefighters operating on a scene who discover that the incident is the location of an illegal drug lab should immediately withdraw to defensive positions. Water should be used judiciously, and hand lines should never be directed into areas where chemicals are present. An extremely reactive chemical used in the manufacture of methamphetamines is lithium aluminum hydride, which can explode violently upon contact with the slightest amount of moisture.

Firefighters should be cognizant of the possibility that vapors emanating from the lab are usually narcotic and could be acutely toxic and that anyone operating in the hot zone must employ full protective clothing and SCBAs. When operating in the cold zone, firefighters will wear full protective clothing and SCBAs in the standby position. Once an assignment is completed, companies must check with the haz mat unit as to whether they need to undergo decontamination procedures.

## INTERIOR SIGNS OF A CLANDESTINE LAB

Firefighters need to recognize the interior signs of a lab by being observant. Indicators could include:

- Laboratory glassware like beakers, flasks, funnels, etc.
- Distillation equipment
- Plastic or rubber tubing
- Laboratory supplies
- Heating apparatus, such as hot plates
- Filter paper, scales, thermometers
- Glass containers/bottles or drums of chemicals
- Chemistry reference books
- Books referencing illegal operation, i.e., *The Anarchist's Cookbook*
- Numerous empty pillboxes or containers
- Amber-colored gallon jugs with no labels or outside identification

## FIREFIGHTING

Though drug labs are normally police operations, once a fire starts the fire department takes the lead role to control and extinguish the fire. Firefighting operations at drug labs are dangerous due to the hazards and instability of the chemicals involved. If a task force consisting of police, fire, and DEA are already operating at the scene of a suspected CDL when a fire occurs, the prime objective is to safely remove everyone from the building. Care must be taken to minimize the use of water and restrict the number of firefighters entering the building. Once evacuation is completed a working fire should be handled

by going to a defensive attack in which the fire is allowed to burn and the protection of exposures is initiated. The threat of attempting to extinguish these fires is a danger to firefighters due to the potential for explosions, toxic smoke, and contaminated runoff that will cause pollution to waterways. Firefighters should set up fixed monitors to protect the surroundings and then be withdrawn from the hot zone.

If firefighting operations are underway when it is realized that a drug lab is involved, the fire attack teams should be withdrawn immediately. Use hose-lines to gross decontaminate personnel. Set up for a defensive attack with unmanned monitors and move personnel upwind.

Some indicators of methamphetamine lab fires are:

- Unusual flame color due to the chemicals involved
- Violent reactions to water streams
- Strong chemical odors
- Empty chemical containers

A hot zone must be established and entry must be limited to those involved in suppression. Full protective equipment must be enforced in the hot zone. The warm zone should be set up for decon so firefighters can be immediately deconned prior to removing their SCBAs to prevent off-gassing of hazardous materials being inhaled or absorbed.

Utilities should not be turned off until the chemist gives his/her approval. Premature shutting down of the utilities can impact the "cooking" process in a negative way. Water for cooling purposes is an integral part of the process; shutting it down can prevent cooling water from reaching the process and cause overheating that could result in an explosion. Shutting down the electric could have a similar negative effect on a process, if electrically driven pumps are present. Disruption of the cooking process can occur by turning off the gas supply.

Prior to operating in a hot zone, members must have their vital signs checked and recorded. After being decontaminated, members must undergo medical evaluation by having their vital signs retaken and checked against those taken prior to entry. Additionally, members should be checked for any symptoms of exposure to toxic chemicals that could include nausea, vomiting, headaches, burning sensations in nose, throat, or lungs, drowsiness or being unusually tired, numbness of lips, eyes not focusing.

## CLANDESTINE DRUG LAB CLEANUP

A major factor with CDLs is that after the evidence has been seized and processed, law enforcement is responsible for the removal and disposal of the hazardous waste at the illegal laboratory. Cleanup costs for methamphetamine labs can run from $3,000 to $100,000. The waste can range from a small amount to several tons. It can include solvents, reagents, precursors, and byproducts, and it can be reactive, explosive, flammable, corrosive, and/or toxic. A variety of gases are used in CDL, including phosphine, anhydrous ammonia, and methylamine. These gases are compressed in small cylinders or in tanks similar to those used for propane gas grills.

## SIZE-UP FACTORS FOR A CLANDESTINE DRUG LAB

### Water

- Water should not be used in active CDL due to the potential for an explosion.
- Master stream devices should be placed as a precautionary measure should the CDL ignite or explode.

### Area

- The affected area may be quite large since the fumes can be deadly and spread throughout a structure.
- An explosion could cause a fire to spread rapidly and involve a large area.

### Life Hazard

- Individuals can be exposed to the chemicals used in the illegal labs.
- Explosions of the labs can threaten the health and safety of those involved in the illegal activities as well as others who may come in contact with the fumes.
- Responders should not eat or smoke in the affected area. Full personal protective equipment must be utilized and immediate decontamination must occur upon exiting the lab.
- Evacuation of a building housing the CDL and surrounding buildings will need to be considered.
- The haz mat unit in conjunction with the forensic chemist will determine the exact levels of personal protection, including self-contained breathing apparatus or respirator, that are needed. Level B personal protective suits would normally be the minimum protection required. If a higher level of skin protection is required then Level A protection can be used.

### Location, Extent

- The assessment team will sample the atmosphere within the lab to determine the explosive limits, oxygen levels, and the extent of toxins present.
- The haz mat unit should secure air readings in surrounding areas to assess the dangers that exist.
- Typically an extensive area of contamination would require decontamination and cleanup.
- Hot, warm, and cold zones must be defined, constantly reevaluated, marked, and enforced.
- The extent of the area involved would expand if an explosion occurs with the cooking process.

### Apparatus, Personnel

- A multi-agency response will be needed including police, fire, haz mat unit, DEA, cleanup contractors, and emergency medical personnel.
- There may be an immediate need for EMS personnel for civilian casualties.
- Medical monitoring of emergency responders prior to entering and upon leaving the hot zone will be required.
- Decontamination will be needed to handle responders and any civilians that are contaminated.

### Construction/Collapse

- An explosion in the lab could seriously damage a structure and collapse should be considered.

### Exposures

- There is the potential for spread of fire to nearby buildings if the lab becomes heavily involved in fire due to a malfunction of the chemical process.
- Explosions may damage nearby buildings.

### Weather

- Dispatch should transmit the current and anticipated weather conditions to the responders.
- Rain can spread chemicals in vessels that have been left outside, or from discarded containers used in the cooking process, contaminating areas and possibly entering well water or sewer systems.

### Auxiliary Appliances

- Sprinklers, if present, may cause runoff problems.

### Special Matters

- There is a possibility that booby traps or explosive devices have been placed to harm emergency responders.

### Height

- A CDL can be found in a building of any height. Naturally, a taller building will compound the fire department's problems.

### Occupancy

- CDLs have been found in every type of occupancy including moving vehicles.

### Time

- Response to a CDL can occur at any time.

## STRATEGIC CONSIDERATIONS FOR A CLANDESTINE DRUG LAB

### Strategic Goals for an Offensive Attack

- An offensive attack would be made for rescues followed by a switch to a defensive attack once rescues are completed.
- Obtain an assessment of the fire or incident area as soon as possible.
- Once an assessment has been made, immediately call for additional resources, including EMS and other agencies that can assist. This is especially the case if the fire department is the first agency on scene.
- If a fire is involved, attempt to contain it to the area of origin.
- Evacuate occupants and have decontamination set up, if necessary.
- Set up hot, warm, and cold zones.
- Consider wind direction and velocity.
- Arrange for runoff water and decontamination water to be captured and disposed of properly.

### Incident Management System Considerations/Solutions for an Offensive Attack

- Incident Commander
- Unified Command (if needed)
- Safety Officer(s)
- Liaison Officer
- Intelligence/Investigations Officer
- Rapid Intervention Crew(s) (The level of protection of the crew[s] must be equal to that of those operating within the hazardous areas.)
- Operations (if needed)
- Hazardous Materials Group or Branch
- Logistics
- Base
- Staging
- Ventilation Group Supervisor
- Search and Rescue/Evacuation Group
- Division(s) or Branch(es) (This could involve interior or exterior areas.)
- Medical Group or Branch
- First-Aid Stations

### Strategic Goals for a Defensive Attack

- If changing from an offensive to a defensive attack, ensure that a personnel accountability report (PAR) is taken for accountability purposes.
- Reassess the hot, warm, and cold zones and adjust, if necessary.
- Set up a collapse zone, if necessary.
- Evacuate surroundings structures that are threatened.
- If using water streams, consider unmanned master streams.
- Protect exposures, if necessary.

CHAPTER

# 11

# After the Incident

"Life is a test; take good notes."

—Author Unknown

A formal critique should be held after major emergencies or significant events. *Used with permission of VA Medical Center.*

## KEY TERMS

**critical incident stress,** *p. 570*

**incident critique,** *p. 565*

## OBJECTIVES

Upon completion of this chapter, the reader should be able to:

- Recognize the signs and symptoms of incident stress.
- Recognize the benefit of both formal and informal critiques.
- Understand how to perform a self-critique.

**Resource Central**

For additional review and practice tests, visit **www.bradybooks.com** and click on Resource Central to access book-specific resources for this text! To access Resource Central, follow directions on the Student Access Card provided with this text. If there is no card, go to **www.bradybooks.com** and follow the Resource Central link to Buy Access from there.

Chapter 11 looks at two important areas: critiques and critical incident stress.

When the physical work at an incident has been accomplished, there are still tasks that must be performed. An overall review of what caused the emergency and how the fire department handled everything must be undertaken. This introspective look should be accomplished by each person individually, together as a unit, and overall by the Incident Commander. This effort to find areas for improvement by never leaving a stone unturned will ensure that our operations will constantly improve.

An incident scene review must look at the potential impact on a firefighter who has been exposed to traumatic events. Ensuring that assistance is available and compelling affected firefighters to attend a critical incident stress debriefing is a good first step. This can help in identifying whether additional help will be required.

## Incident Critiques

A strong point of the fire service is the constant desire to improve operations. A basic way to do this is through critiques of previous incidents.

The **incident critique** is meant to reconstruct events and assess how the fire department performed.

**incident critique** ■ A means to construct events and assess how the fire department performed at an incident. The outcome should be to improve operations.

- What worked well?
- Where is improvement needed?
- Do operational guidelines need revision or modification?

Well-run incidents can serve as benchmarks for future operations. Where many problems confronted firefighters, solutions can be shared with other department members.

In the past, critiques in some departments were a way of chastising members. They were used as whipping posts to embarrass officers, with the thinking that this form of negative discipline would improve future operations. In reality, it stifles incentive. This negative type of critique degenerated to a "cover your anatomy" philosophy. Fire officers attempted to escape the meeting unscathed and would shed no light on the operation, fearing the wrath of departmental leadership should a mistake be discovered. The overall effect destroyed the concept of openly sharing successes and failures.

Many departments have replaced the term *critique* with *postincident analysis*. The word *critique* is defined by Webster as "a critical estimate or discussion." The success of a critique lies not in its title, but in the openness of the participants and in their willingness to conduct an honest review of the incident to improve future operations.

### TYPES OF CRITIQUES

Critiques can range from a discussion between company members after a minor fire to a full-blown review that includes all fire officers who responded to a large-scale incident.

#### Informal Critique

The informal critique is for a company or multiple companies. (See Figure 11-1) The aim is to review the actions taken and their impact on the overall operation. This review can take place at the incident scene, the kitchen table in the firehouse, or any convenient location.

#### Formal Critique

A formal critique should be held after most major emergencies or significant events. A date should be selected as soon as possible after the incident. This should consider the time factors necessary to gather any technical information that may be needed. Participants should be invited and required to attend. A facilitator should be selected to ensure

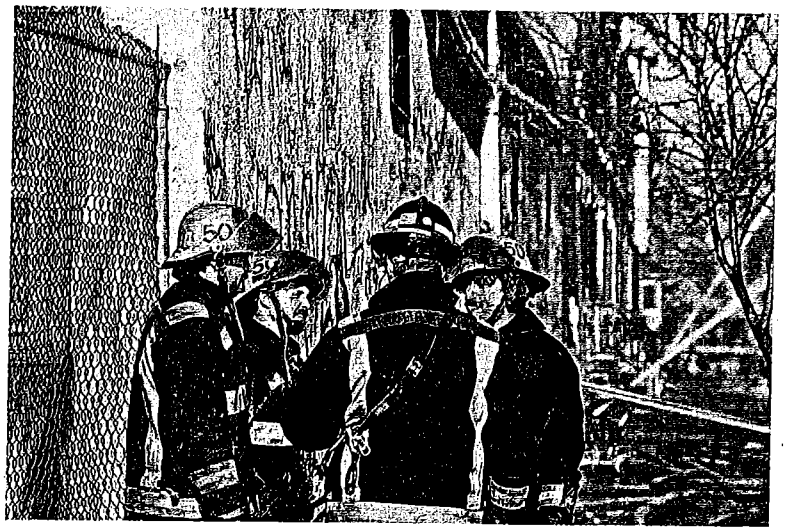


**FIGURE 11-1** An informal critique by company members can be accomplished at an incident scene. *Used with permission of Joseph Hoffman.*

that the critique proceeds without being bogged down with prolonged discussion. Time limits should not be imposed on meaningful discussion, however.

Each area of the incident must be reviewed. This includes decisions by the Incident Commander, members in major assignments, and division and group supervisors.

The critique should start with the highest-ranking officer stating the anticipated benefit of the critique. He or she should stress that the purpose is not to place blame for mistakes but to decide how to implement lessons learned in the future. The IC should give a brief overview of the incident and highlight the positive occurrences, as well as some problems that need review. By recognizing problems at the start, solutions can be addressed later.

A critique can be successful only if an open environment is created and the participants are encouraged to be forthcoming in their observations. Commanding officers can foster this environment by a willingness on their part to discuss problems and failures that they personally encountered. This creates an environment of sharing.

The representative from the dispatch center can start the presentations. What information was received and what equipment was dispatched? There should follow a natural progression from the first-in company.

1. What did they observe on arrival?
2. What information did they receive?
3. What personal knowledge were they able to utilize?

The discussion by the first-in company should be followed by all participants who commanded units or were responsible for a major segment of the operation. They should discuss their observations, problems encountered, orders received or given, and actions taken. The critique can conclude with the fire marshal's findings on origin and cause.

A recorder should take notes to prepare the final report. Special emphasis should be placed on problems encountered, solutions, and failed remedies.

### Self-Critique

Self-critique is an important method for firefighters seeking self-improvement. Firefighters should review the operation.

- What were their areas of responsibility?
- Was search and rescue performed in a timely manner?
- What did they attempt to accomplish with the initial hose-line?

- Why did they stretch the hose-line through the front door?
- Was that the best method of extinguishment?
- If not, what was?
- What was the best way to ventilate?
- Was the roof opened in the right location?

## INDIVIDUAL DEVELOPMENT

Assigning a new recruit to an experienced firefighter is part of the development process of the recruit. In that situation, a discussion of what occurred should take place between the two after each incident. The recruit should be encouraged to ask questions about why certain actions were performed a certain way. The explanations will assist him or her in understanding the importance of assignments and the teamwork needed for safe, efficient operations. This review is a key factor in a recruit's professional development. This process allows recruits to correct mistakes and develop good fireground habits.

An officer has to review his or her areas of responsibility:

- Did I properly size up the situation?
- Were my calculations of the seriousness of the incident consistent with the overall outcome?
- Did I call for sufficient resources?
- Did I call for too many? (This is usually the exception. The error most often made is underestimating the seriousness of the situation.)
- What basic orders did I give?
- What did I hope to accomplish with those orders?
- Did I properly prioritize the incident?
- What areas needed attention that I did not initially address?
- Did I formulate an overall plan and give that information to the units performing those assignments?
- How were search and rescue, ventilation, and other strategies addressed?
- Did I overload my initial units with too many orders?
- Did I get sufficient feedback from the divisions and groups?
- Did I frustrate their efforts or assist them in accomplishing their goals?

Critical analysis starts with being truthful with yourself. Every fire that we have ever responded to has gone out. This can be as a result of a great effort by the responding firefighters or in spite of them. Supervisors must recognize exceptional effort and praise those who have earned recognition.

Firefighters want meaningful feedback. They certainly desire praise if it is earned, but also seek direction for self-improvement. If praise is given regardless of the effort expended or the outcome of the operation, a grave injustice is done.

The fact that a fire is extinguished does not mean that praise is warranted. A firefighter making a mistake and being praised for doing a good job will make the same mistake the next time. Orders must be given to rectify problems encountered. In the aftermath of the incident, either an informal or formal discussion must take place to review proper strategies and tactics and discuss any mistakes that occurred. The personnel who have made mistakes should be taken aside and have explained to them the proper way of performing the assignment.

Commanding officers should place mistakes or errors into two categories: those of commission and those of omission. A firefighter making a mistake because he or she took the initiative to attempt something is not in the same category as the one who stood by and did nothing. We must recognize those willing to attempt a solution and try to motivate those who do not attempt to intervene to mitigate the problem.

## NIOSH FIREFIGHTER FATALITY REPORT F2009-23

On August 24, 2009, a 45-year-old male career lieutenant (Victim #1) died following a partial floor collapse into a basement fire, and a 34-year-old male career firefighter (Victim #2) was fatally injured while attempting to rescue Victim #1. The career fire department was dispatched for "an alarm of fire" with reported civilian(s) entrapment. Arriving units discovered a heavily secured mixed commercial/residential structure with smoke showing. Following failed initial attempts to locate an entry to the basement, crews located a door on Side 2 that provided access down a flight of stairs to a basement entry door. Repeated attempts were made to force open this basement door in order to search for trapped civilians, but crews had difficulty gaining access through this door because it was made of steel and locked and dead-bolted on both sides. Other crews on scene performed primary searches of the first and second floors and found no civilians.

Approximately 30 minutes into the basement fire, Command ordered all interior crews to exit the structure in order to regroup because crews were still unable to gain access into the basement from Side 2. Additional manpower was sent with special tools to assist in breaching the basement door on Side 2. Victim #1 and two firefighters from his crew entered into the structure from Side 1 to verify all firefighters had exited a first floor deli. Victim #1, following a hose-line into the structure, was well ahead of the other two firefighters when the first floor partially collapsed beneath him. Victim #1 fell with the floor into the basement, which exposed him to the basement fire. The other two firefighters immediately exited the deli after fire conditions quickly changed and shelving and displays fell on them. They were unaware of what had just occurred. Victim #1 made several Mayday calls from within the structure and activated his PASS device. Confusion erupted exteriorly on scene when trying to verify who was calling the Mayday, what his exact location was, and how he got into the basement. The Incident Commander was aware that he had crews attempting to gain access into the basement from Side 2, but was unaware that there had been a floor collapse within the deli section of the structure. Simultaneously, Victim #2, a member of the firefighter assistance and search team (FAST), was standing by outside Victim #1's point of entry when the Mayday calls came out. It is believed that Victim #2 knew where Victim #1 was since he had gone in the structure with him earlier in the incident. Victim #2 grabbed a tool, went on air, and rushed into the structure. The FAST and additional personnel on scene concentrated on Side 2 initially while other firefighters followed an unmanned hose-line into the deli. Crews within the deli quickly discovered a floor collapse and reported hearing a PASS device alarming. Victim #1 was immediately identified as missing during the first accountability check, but Victim #2 was not accounted for as missing until the third accountability check, more than 50 minutes after Victim #1's Mayday. After the fire was controlled, both victims were discovered side by side in the basement where the first floor had partially collapsed. They were found without their face pieces on and with SCBA bottles empty. Victim #1's PASS device was still alarming. They were pronounced dead on scene. Four firefighters and one lieutenant suffered minor injuries during the incident. No civilians were discovered within the structure.

Key contributing factors identified in this investigation include working above an uncontrolled, free-burning basement fire; interior condition reports not communicated to command; inadequate risk-versus-gain assessments; and crew integrity not maintained.

## FINAL REPORT

A written report of the critique's findings should be shared with the members who attended, other fire department members, and the mutual-aid departments that responded. The report can be divided into three sections. The first part is a narrative account describing conditions, problems encountered, life safety considerations, and fire department actions.

The middle section is a review of specific areas. It should start with the vital statistics of the incident: date, weather, times, dispatch numbers, specific location, who responded, injuries, and other pertinent information. This should be followed by addressing each area of the assignment. The content of this section can vary, depending on the assignment and the needs of each department. Some general areas are:

### Communications

Did any problems arise? Did dispatch receive proper and timely reports?

### Size-Up
This should include dispatch information received and conditions observed during the course of the fire, as well as problems encountered.

### Incident Management System
What staff positions, divisions, or groups were created? An addendum can be included showing an incident management organizational chart for the incident with the names of those who assumed the various positions.

### Strategy and Tactics
Review the strategies developed and the tactics initiated. What changes, if any, had to be made to facilitate their accomplishment? What problems arose that required special attention?

### Medical Assignments
What medical problems had to be handled? Was this a mass casualty incident? Were first-aid stations set up? Was rehabbing of firefighters needed? If so, how was it accomplished? If the medical group consisted of units outside of the department, how did the fire department and these units interact?

### Safety
What were the safety issues? Was a Safety Officer assigned? What problems confronted him or her? A list of all injuries and how they occurred can be included. Recommendations on the prevention of future injuries can be noted under lessons learned.

### Apparatus and Equipment
Was apparatus properly placed and utilized? Could special equipment in either the department or a mutual-aid department have completed the assignment in a safer manner? Did the equipment on hand meet the needs of the incident?

### Resources
Were requests for additional resources timely? Was there a time when certain functions could not be performed due to a lack of resources at the scene?

### Outside Agencies
What agencies were requested and responded? Did they meet the needs of the incident? How can they better assist us in the future?

**FIGURE 11-2** Utilizing simulations and then critiquing the participants is an excellent tool for officer development.

### LESSONS LEARNED, LESSONS REINFORCED

The final component of the report should be a lessons learned section. Because the critique is a learning process, mistakes discovered can be beneficial to everyone. This section should be written in a positive way. For instance, if deluge guns were not properly secured, the report in the lessons learned area can state that the importance of securing all master streams was reinforced on this assignment. If improperly placed apparatus were relocated due to the instability of walls, it can be noted that the initial proper placement of apparatus negates the need to shut down hose-lines to move them later in an operation. The main purpose of this section is the sharing of information.

A committee should routinely compare the critique reports with previous ones to see if there are recurring problems or patterns developing that need to be addressed.

## Critical Incident Stress

Firefighters are extremely dedicated individuals who hold themselves to a very high set of standards. They are action-oriented and seek immediate results. Firefighters have been looked upon as being tough as steel. No matter what they are confronted with, they accept the challenge and give their best effort. When dealing with serious injuries, they must block out the emotional aspects of mutilation and human suffering and continue to extricate and treat the injured or remove the dead. They are able to make difficult decisions under the pressure of time constraints and deteriorating incident scene conditions. They attempt to accomplish perfection at an emergency incident while operating under circumstances that would be overwhelming to others.

Because firefighters are so highly motivated, they become frustrated when, despite their skills, rescues cannot be made and those they are trying to help are injured or killed. As a result, they can suffer from **critical incident stress**.

critical incident stress ■ Stress experienced by firefighters exposed to traumatic incidents.

As much as firefighting is physical, it is also one of the most psychologically stressful jobs. This is reflected in the large number of injuries sustained by firefighters due to stress. A major source of stress comes from the many emotional occurrences confronting firefighters at incident scenes. Stress occurs when critical decisions have to be made in a short period of time. Firefighters rely on their experience and training to evaluate information and act upon it. If an operation is not completely successful, they will review every action and decision, seeking a reason for failure. This individual critique can mislead them into self-blame and acceptance of full responsibility. Firefighters will become frustrated and magnify what occurred. Stress will increase if they ponder only the outcome of the operation and not the many factors that affected their decisions and actions. In retrospect, many pieces of information known after an event were not available to the firefighters to assist them in their decision making during the operation.

Firefighters associate fireground events to their own situations. When a fellow firefighter is injured or killed at an incident, they question why the injury occurred to someone else and not them. They may falsely blame themselves for either causing the injury or not preventing it. This sense of guilt adds to their stress. Likewise, when confronted at an incident with the death of a child, firefighters may realize the vulnerability of their own children and the pain and suffering being felt by the child's parents. Their frustration in being unable to perform rescues will be replayed over and over in their minds.

Because firefighters have the same concerns as everyone, they must express their feelings. If kept bottled up, these feelings can become a destructive force. Traumatic incidents that affect firefighters psychologically have a direct impact on their performance.

### INCIDENT COMMANDERS

Incident Commanders and Safety Officers must be alert to the physical and emotional needs of firefighters. Being able to predict how a firefighter is affected by incident scene

occurrences is difficult. Commanding officers must monitor their firefighters for symptoms of stress. Some immediate indicators are shaking or trembling, loss of coordination, blurred vision, respiratory problems, confusion, shock, disorientation, and frustration. If a firefighter's actions reflect signs of undue stress, the officer should act immediately to remove that individual to a rehab area for medical treatment and evaluation.

Some recommended incident scene procedures to alleviate stress are to:

- Schedule five-minute breaks for units as often as possible
- Rotate personnel (Though most firefighters do not want relief, it must be done.)
- Provide a rehab area with hot and cold drinks (avoid caffeine and nicotine)
- Have firefighters medically screened by EMS personnel or a physician

## DEBRIEFING

Critical incident stress debriefing (CISD) will reduce incident stress. Mental health professionals and peer counselors are needed for a formal debriefing. This should occur as soon as possible after the event and must include all members who responded to the incident. The setting should allow each participant to talk (though no one should be forced). Discussing the incident brings into the open the fact that everyone has similar concerns. Members should be encouraged to vent their frustration, anger, fear, and other emotions. They should tell of any particularly painful occurrences and should be encouraged to talk of any feelings of pride that they felt due to their accomplishments.

The debriefing must be strictly confidential. No records should be kept and only those firefighters directly involved in the incident and the debriefing team should attend.

In the past, debriefing was often accomplished (though not realized by the firefighters) in an informal setting by firefighters gathering after an incident and talking about what happened. These discussions served a similar purpose as the CISD. A big difference though was the lack of trained professionals, and no follow-up was available to those firefighters needing it.

Ground rules should be set whereby CISD is mandatory for certain situations. Mandatory CISD should include the death or serious injury to a firefighter, death of a child, mass casualty incidents, incidents involving an extrication process exposing rescuers to trapped victims for a long period of time, or unusual occurrences causing stress to the firefighters.

## DELAYED STRESS

Firefighters may have no immediate reaction to stress at the scene. Reactions can show up days or weeks after the incident because a firefighter may be unable to get over it and put it in the past. Firefighters who still revisit a tragic event in dreams or flashbacks after several weeks should seek professional help.

In severe cases, if stress persists, a firefighter who does not receive treatment can develop delayed symptoms or even a posttraumatic stress disorder. Potential problems that may require attention are upset stomach, sleep disturbances (nightmares, insomnia), displays of anger, irritability, rage, respiratory difficulties, headaches, rashes, loss of concentration, phobias, sexual disturbances, depression, increased use of alcohol and/or tobacco, changes in appearance and job performance, and other problems.

## TAKING CARE OF OUR OWN

The aggressive attitude firefighters bring to the incident scene is to rescue everyone endangered while gaining control of the incident as quickly as possible. Real-life situations present barriers that must be overcome to achieve this, Delayed alarms, companies on other responses, severe weather conditions, heavy traffic, and other factors beyond the control of the fire department can complicate the department's efforts. Failure to accomplish tasks, along with deaths and injuries, can cause stress.

In the past, it was felt that anyone who did not bounce back immediately from these horrible incidents was not strong. This attitude is wrong and has no place in the fire service. No stigma should be attached to firefighters seeking assistance to help themselves in overcoming emotional feelings that develop from incident stress.

It is the fire department's responsibility to provide debriefing and ongoing medical treatment, if needed, to assist firefighters in coping with critical incident stress. For fire departments to provide psychological assistance to their firefighters, they must have a plan in place prior to an incident.

The plan should consist of two parts: education and treatment. A program should be initiated to educate firefighters on the effects of emergency scene stress. This will increase their awareness of the warning signs of stress and help them to cope when confronted with critical stress situations. An integral part of the plan should be the development of CISD teams or the ability to assemble them quickly from adjacent fire departments or a statewide system.

## Epilogue

In summarizing, I hope that the information contained within this book will be beneficial. A lifetime of experiences is condensed into the preceding pages.

My one wish for the fire service is to find ways to reduce injuries and eliminate firefighter deaths. I think if we follow the 16 Life Safety Initiatives we can have a positive impact. If I could challenge all firefighters, it would be never to allow a serious firefighter injury or firefighter death to occur without learning something from it that allows them to perform their duties in a safer manner.

The strength of every fire department is its firefighters. They are, in my estimation, the finest group of individuals I have ever encountered. Regardless of the part of the country or the name of the individual fire departments, firefighters are a breed of their own. Dedication, commitment, perseverance, and loyalty are but a few of their universal traits. The names may change, but the basic mission remains the same.

I would like to leave you with a closing thought. In 1987, I was promoted to deputy chief and assigned to the First Division. My area of responsibility covered one-half of the City of Philadelphia. It included hundreds of high-rise buildings, an international airport, miles of piers, crude oil refineries, the United States Naval Base, and just about any problem associated with a large metropolitan area. On my first day, I was sitting at my desk checking everything out when under the glass on the desktop I spotted an index card yellowed with time. It put everything in perspective. It read:

> *"The objective of all dedicated chief officers should be to thoroughly analyze all situations, anticipate all problems prior to their occurrence, and have answers for these problems when called upon. However, when you are up to your ass in alligators, it's difficult to remind yourself that your initial objective was to drain the swamp."*

BE SAFE OUT THERE

## CHAPTER REVIEW

### Summary

When the fire is out or the medical response has brought a patient to the hospital, there may be other factors that still need to be dealt with before the incident is complete. The type of incident may require some form of critique. The critique should be looked upon as a great learning tool that improves the way that we operate.

In addition to a critique, the implementation of critical incident stress debriefings aids firefighters in putting a difficult incident in the past. The counseling they receive allows them to function properly at future incidents and maintain a healthy family life.

### Review Questions

1. When should a formal critique be conducted?
2. What are the components of a self-critique?
3. List specific decisions that company officers should review in their self-critique.
4. List areas where improvement has occurred in your department due to problems found during critiques.
5. List incident scene occurrences that could trigger critical incident stress.
6. What are some immediate indicators of stress?
7. Does your department have a procedure in place to address critical incident stress? Are all members familiar with departmental guidelines?

### Suggested Readings, References, or Standards for Additional Information

National Firefighters Foundation, Taking Care of Our Own: A Resource Guide, 5/2001.